

TEXTILE WORLD JOURNAL

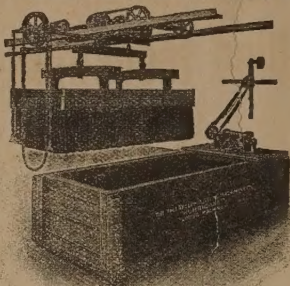
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VOLUME III

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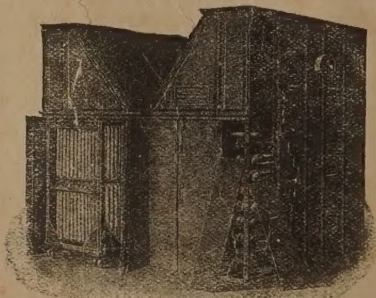
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TEXTILE WORLD JOURNAL
KINK BOOK—VOL. III

COMPILED FROM THE COLUMNS OF
TEXTILE WORLD JOURNAL

BY

CLARENCE HUTTON
(*Technical Editor, Textile World Journal*)

BRAGDON, LORD & NAGLE COMPANY, INC.
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FOREWORD

Like its predecessors, this book has been compiled from the Questions and Answers department of TEXTILE WORLD JOURNAL. The aim, as in earlier volumes, is to make available in convenient reference form formulas, recipes, tables and other useful technical data. The present volume has been compiled from matter originally published during 1918. The question and answer form has been preserved because the important points in a problem from the enquirer's viewpoint are often of the greatest value. The answers have been supplied by practical manufacturers, superintendents, overseers and experts in mechanical and chemical lines, to whom we make grateful acknowledgement. A carefully prepared index at the end of the book enables easy reference to subjects. New problems are covered each week on the Questions and Answers page of TEXTILE WORLD JOURNAL, and the editors invite all subscribers to make use of its facilities for getting information on subjects in which they are interested.

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NEW YORK

TEXTILE WORLD JOURNAL

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Ends Sticking in Colored Warp

The enclosed sample of green warp was dyed in our own dyehouse. This is giving us great difficulty in beaming as the threads stick together, making it very troublesome to beam the warp. The dyeing is done with 2 per cent. of Direct Yellow K. M. and $\frac{1}{4}$ per cent. Direct Green M. T., with 10 per cent of salt, after which it is topped with $\frac{1}{2}$ per cent. Victoria Green and 1 per cent. of Acetic Acid. The first two runs are cold while the second two are heated from 120 degrees to 160 degrees. Will you please advise us what is likely to be the cause of the warps sticking together? (3202)

There is nothing in any direct dyestuff which would cause this effect and the appearance of the dyed material shows that it is not exceptionally fuzzy. The union of basic dyes and direct dyes on the fiber gives rise to an insoluble material which results in the fixing of the basic color. If the direct dyestuff, however, has not been completely taken up by the fiber, and if there are traces of the direct color in the liquor or simply absorbed by the cotton, it is possible that the insoluble matter will be precipitated outside the fiber. If this takes place in such a manner that a tarry or gummy mass is formed it can easily cement together the fine fibers on the surface of the threads. This would cause the separate threads to be bound together just enough to cause trouble for the beamer. The formation of this precipitate is hastened by acidity and absolutely prevented by an alkaline condition. Victoria green, however, is decolorized by an alkaline condition, so that the only remedy would be to have the topping bath as neutral as possible.

We believe that a somewhat higher temperature would be an advantage at the finish. Another reason, which might be investigated, is that the Victoria green might have been reduced with dextrine or soluble starch. The presence of any considerable quantity of such substances in the dyestuff would easily cause this effect if the final rinsing had not been complete.

Backwinding Full Fashioned Hosiery Press-offs

Will you kindly let me know the best method of backwinding full fashioned hosiery press-offs to get the kinks out of the yarn? I am working on mercerized cotton and silk.
(3222)

The best way to backwind full fashioned hosiery press-offs is to run the yarn over a piece of knitted web, the ends of which are immersed in a softening oil. For this arrangement it is a good plan to have a cylinder about 4 inches in diameter in front of the winder. About one-half of this cylinder is immersed in a trough containing a softening oil and the oily knitted web which is to impart the oil to the backwound yarn is placed on the cylinder with its edges extending down into the oil. The backwound yarn running over the oiled web takes up enough of the oil to prevent kinking. It is a good plan to let the yarn set on the bobbins for 24 hours before knitting, or over Sunday. An oil should be used that is easily washed out of the goods before dyeing.

Backwinding can be done on a bobbin winder. For pure silk a winder using a small bobbin is best; for mercerized cotton, larger bobbins are used. Provide a low narrow table to be placed in front of the winder so that the knitted material to be backwound can be kept clean from floor dirt. In the top of this table place short sharp hooks; attach the end of the web to these hooks, then fold the web in a pile over the hooks, making the folds longer at the bottom than at the top of the pile so that the pile will be in the shape of a large inverted letter V. If the web has been knitted very tight, it may be necessary to place a weight on it to hold it away from the guide on the winder. In this case, place a flat weight on the side of the pile away from the winder, so that as the web is unwound it will be pulled from under the weight. Be careful not to have too much weight, so as to avoid breaking the yarn.

A hosiery mill superintendent writes as follows: The correspondent must use a winder. Cut the cotton tops off, ravel

to a straight course and wind the yarn on a bobbin; the toe and heel cannot be wound off very well, therefore, they will have to go to waste.

Loss in Bleaching Turkish Towels

What weight is added to Turkish towel yarn during the sizing process? What is the loss in weight when the yarn is bleached? What is the loss in weight when the towels are bleached? (3152)

These are questions to which every towel manufacturer could give different answers, depending on the practice in his mill. The increase in the weight of yarn during sizing is not the same in every plant. It depends on the mixture and consistency of the sizing solution as well as on the material; the setting of the sizing or slashing machine also has a bearing on the question. The weight can be materially increased by adding weighting materials to the sizing solution, such as chloride of zinc, Epsom salts, sulphate of lead, barytes and even plaster of Paris. Weight gained in this way is lost in the bleaching process.

A fine, hard twisted yarn will not absorb as much size as a coarse yarn with less twist. If the enquirer will weigh a few hanks of yarn before and after sizing, the gain will be disclosed. The yarn for a good quality of Turkish towelling should gain about eight per cent. in weight, or perhaps a little more, according to the setting of the machine. When the yarn is bleached it will probably lose from four to six per cent., depending on the process. There is a gain of one to one and a quarter per cent. between the sizing and after bleaching, allowing for waste. This applies to the bleaching of the towels after weaving. An excessive loss between the yarn and the finished towel may be caused by overbleaching. The weight of the towels is sometimes increased by starching or other methods of weighting. Turkish towels woven from the bleached yarn will yield more seconds than towels that are woven in the grey and then bleached, as towels from bleached yarn are liable to get dirty in the process. If woven from the grey yarn and then bleached the goods will have the dirt bleached out.

The enquirer should read the articles on losses in bleaching cotton, linen and union toweling which appeared in *TEXTILE WORLD JOURNAL* of August 26, 1916, and October 28, 1916. The results of some very interesting tests are given and should prove helpful.

Shock Absorbers for Electric Lamps

Is there a fixture used in mills to prevent excessive electric lamp breakage due to vibration of mill buildings? I would like to learn of a device to absorb the shock before it reaches the filament. (3226)

At least two devices have been used to prevent lamp breakage due to vibration. The first is a home-made device, which the writer considers very efficient. It is made as shown in Fig. 1. The lamp cord is passed through the holes in the



FIG. 1

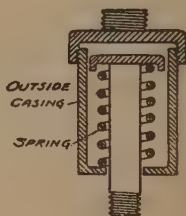


FIG. 2

piece of fiber at the top, then through the two holes in the bottom fiber, leaving three or four inches of slack cord. The proper strength of spring can be determined by experiment only. It should be just strong enough to prevent the lamp from taking an up and down motion from any cause, but should be weak enough to be extended somewhat by the weight of the lamp.

The second device is shown at Fig. 2. The pipe thread at the top is for the fixture or ring. The outside case is stationary and the inside or movable case is supported on a spring which takes up the vibration. The bottom pipe thread is for the lamp fixture.

Before laying excessive lamp breakage wholly to vibration, it would be well to be positive that the voltage of the lamps is correct for the line. If the lamps are in an unfrequented place, some person or persons may be taking them and sub-

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stituting burned out ones in their place. As mazda lamps are now made, any jar which would break them would amount to abuse, and possibly should be overcome by one of the above devices.

Wool Card and Mule Production

I want to find out how many spindles are figured for one end from a finisher card. That is, on the average run of work, mostly full draft or shoddy work. (3167)

On full draft work where there is a small amount of twist required, 5 to 6 spindles should keep up to a ring on the card, providing the mule is kept up to its proper production. It depends largely, however, upon the amount of twist used, the condition of the machine, quality of work, etc. For 3 run yarn, with the average amount of twist generally used in yarns of this size, about 7 spindles to a ring might be figured.

Trouble with Napped Goods

I am enclosing samples of cloth that we are making and on which I would like some assistance. On these napped goods at times our percentage of seconds, which are mostly caused by what are termed ridgy or wrinkled cloth and torn selvages, reaches as high as 10 per cent. What I would like to know is what process in the making of these goods would cause this trouble? Our filling is very soft twist. The trouble according to the weaver is the filling; the claims of the napper are that it must be the loom. We run in our selvages 8 strands of 2/20s warp and 12 strands 2/20s warp. Ninety-nine per cent. of the torn selvages come on one side of the cloth only. I claim if it does not break on one side it should not break on the other, conditions being equal on the slasher, loom and napper, as it is exactly the same yarn on both sides. My claim is, if it was due to the filling, why should we get some bad cloth and some good. This same thing happens on several numbers of yarn and on all colors of yarn. The percentage of seconds the year round will average only 5 per cent., but will at times jump up to 10 per cent. I would thank you to give me any information that will assist me. (3151)

The warp should make the selvages strong enough. The enquirer fails to state where the damage is done, but from the appearance of the sample, we presume it occurs on the napping machine. There are several causes that will produce this defect. It is not our opinion that the filling is wrong as it is not the filling that tears; it is the warp. The napping machine is in all probability where the trouble lies, either the

cards are set too close in order to get the desired result in fewer runs of the cloth, or the cloth may be run too slack over the napping machine, thus allowing the cards to get too deep a grip and produce what is referred to as "ridgy or wrinkled cloth," and at the same time it will tear the selvage. If the laps are tucked under in front of the machine, allowing the cloth to feed in to the machine in jerks, this might cause the trouble.

The enquirer claims that 99 per cent. of the torn selvages come on one side of the cloth only, and this fact suggests that the napper is not familiar with the working of the machine, as otherwise it would be overhauled to see where the trouble is. If the napping machine and cards are examined we feel confident that they will be found not to be running level; either the bearing on one side has worn down, allowing the cards to get too near the fabric on that particular side, or some such condition. He might also note whether the damage occurs on the same side the belt that drives the cards is on, or are the cards driven from both sides? This might cause the trouble as the cards and driving belts have to be so adjusted that when the machine is started the cards will respond at the same time with an even start. In all probability the belts that drive the cards get smooth and dry and probably covered with lint, causing them to slip and thus making the cards run in jerks.

Any of the above causes will produce the trouble, as will also careless handling in plaiting down the laps after they have been passed through the napping machine. The enquirer states that the amount of seconds for the year round only averages 5 per cent. This is quite good. From the explanation, we believe the trouble is due to the napping machine and if the damages are all on one side it is evident that the machine is either out of level or the cards are lower on one side than on the other. This is due mostly to the setting of the cards; the napper may get them set right one time and another time they will be set too fine, when the trouble begins.

Thread for Looping Cotton Hose

Will you please let me know the right size yarn to use in looping cotton hose, 200 needles, made of 18 cotton yarn, reinforced in toes with 26/2. (3186)

This hosiery should be looped on a 20-point looper, and 80-3 combed Sea Island would be the proper thread to use.

Bleaching Hosiery and Designating Sizes

Will you kindly send us information as to the best methods of handling infants' and children's merino and worsted hosiery through the bleaching room. How are the sizes kept separate and which is the best type of bleaching vat for this line of work?
(3139)

The writer bleaches merino and worsted hosiery with peroxide of hydrogen, and for the bleach bath I use a square vat, made of cement and provided with a false wooden bottom. I have used two methods of keeping the sizes separate; one by using bags for each size, the bags made of fish net material. This method avoids sorting, but is more expensive for the bags soon go to pieces with the repeated bleaching. A better method, and the most economical in the long run, is to mark the sizes with a different arrangement of welts in the top of the leg for each, as follows:

Sizes $4\frac{1}{2}$, $6\frac{1}{2}$ and $8\frac{1}{2}$, knit two welts, space, and then one welt.

Sizes 5, 7 and 9, two welts.

Sizes $5\frac{1}{2}$, $7\frac{1}{2}$ and $9\frac{1}{2}$, three welts.

Sizes 6, 8 and 10, four welts.

The sizes having the same kind of top can be sorted by the length of leg, as size $6\frac{1}{2}$ has a longer leg than $4\frac{1}{2}$, and size $8\frac{1}{2}$ than $6\frac{1}{2}$, the same being true with the other tops and sizes.

A bleacher replies to this question as follows: To bleach children's merino or worsted hosiery the goods must be thoroughly scoured in a rotary washing machine with plenty of water, at about 120-125 degrees F., with enough olive soap solution to produce a good lather. I make up a stock solution with 10 per cent. green olive soap and $2\frac{1}{2}$ per cent. soda ash. The goods are scoured for about 20 minutes, and then rinsed in water about the same temperature until entirely free from soap. The hosiery is then extracted and put in laundry nets preparatory to entering bleaching tubs, which are provided with a lead coil and a false bottom to keep the goods away from the pipe. The bleaching tubs should be kept as free as possible from iron, and if there are any nails or other fittings which are liable to come in contact with the liquor, they should be covered with putty or some such substance.

The bleaching liquor should be made up as follows: To every 100 gallons of water add 3 pounds of sulphuric acid and thor-

oughly stir, while adding $2\frac{1}{4}$ pounds of peroxide of soda which should be sifted in. The liquor is now slightly acid, and should be rendered alkaline by adding small amounts of silicate of soda, until it just turns a litmus paper blue.

The bath is then heated to about 140 degrees F., and goods entered and weighted down so that they are completely immersed in the liquor, where they are allowed to remain overnight. The next morning they are lifted out and allowed to drain. If a standing bath is to be maintained, about two-third the quantity of acid and peroxide should be added each day.

The goods are now rinsed in a rotary machine in warm water, and if a softer finish is desired, a softener or a soap can be used, although this is not generally necessary as the goods should be quite soft without this treatment.

The sizes are designated by strings sewed on the hosiery, or by knitting welts around the top. I have used this method for a number of years, and have always found it satisfactory.

Sizing Elastic Webbing

Can you give me some information on the sizing and carding of elastic webbing, with formulas for sizing mixtures?
(3266)

The actual process of sizing is practically the same everywhere. A small shallow box is used to hold the sizing, with a pair of squeeze rolls on top, and compression levers or screws to regulate the amount of sizing left on the webbing. There are so many different mixings for sizes that it is difficult to say which are good ones until they have been tried out on the particular goods. Formulas which, if used on the right materials, will give good results, are as follows:

Recipe No. 1—10 lbs. corn starch, 5 lbs. dextrine, 25 gals. water.

Recipe No. 2—5 lbs. corn starch, 10 lbs. dextrine, 10 lbs. American gum, 1 qt. oil, 25 gals. water.

Recipe No. 3—10 lbs. sago starch, 10 lbs. dextrine, 5 lbs. American gum, 3 qts. linseed oil, 25 gals. water.

Recipe No. 4—10 lbs. corn starch, 10 lbs. dextrine, 1 qt. glucose, 1 pt. linseed oil, 25 gals. water.

Recipe No. 5—10 lbs. corn starch, 15 lbs. dextrine, 1 lb. glue, 1 qt. isinglass, 25 gals. water.

Recipe No. 6—10 lbs. corn starch, 5 lbs. dextrine, 10 lbs. American glue, $1\frac{1}{2}$ qts. isinglass, 2 qts. glucose, 25 gals. water.

Recipe No. 7—5 lbs. corn starch, 5 lbs. American gum, 10 lbs. wheat starch, 5 lbs. flour (steeped in 1 gal. water), 2 qts. linseed oil, 2 qts. glucose, 30 gals. water.

The calendering of the webbing has to be regulated according to the finish required. There are different kinds of calenders for different classes of finish. The writer had a roll machine with the middle roll heated for bright finishes. This was used for silk flowered webbing. In some cases the flower had to be raised after finishing, so we passed the goods over a short bristled brush, back side down, which did the trick nicely. For dull finishes we had a small machine with two wood rolls and one cotton the cotton roll being a soft one with which we got out some very good finishes.

Care must be taken both in sizing and calendering webbing not to use too much tension on the material. If the inquirer has trouble in the sizings and gets the goods too stiff so that the webbing cracks on each side, pass it through oil and water to soften it. This trouble may also occur if the mixings are too strong.

Comparative Yarn Counts

We are making a garment of 2/8s worsted so as to weigh a certain amount; what size or sizes could be used with 2/12s to make the same weight garment, our object being to utilize two or three threads of 2-ply yarn so as to equal a yarn of much lower count? Is there a table published giving this information? (3278)

The count resulting from twisting two different counts together is so easily calculated that a table is hardly necessary for the purpose. It is first necessary to reduce all counts to the same basis, cotton, linen, worsted, run, or grain system. Then the calculation depends on whether the count is based on a fixed weight, as in the case of the cotton system, or on a fixed length, as in the case of the grain or denier method of indicating yarn sizes.

In a given length of plain ply yarn there is an equal length of each of the different single strands, aside from the variation due to twisting and which we will disregard. Thus in one yard of 3-ply made of 20s, 30s, and 40s cotton there is one yard of each of these strands, 20s, 30s and 40s.

If the size of the yarn is indicated by the fixed length method the resulting size is equal to the sum of the sizes of the single yarns. For example, let us assume that three strands

weighing 16, 12 and 20 grains per 120 yards respectively are used to make a 3-ply. The resulting size will be equal to the sum of 16, 12 and 20, which is 48 grains per 120 yards.

To find what fixed length count must be used with the other known counts to give a required resulting count, it is necessary to find out what count added to the others that are known will give the required resulting count. Thus, if we desire to add a third thread to a 16 and a 12-grain thread to make the 3-ply 48 grains, the count of the third thread is found by subtracting the sum of 12 and 16 (28) from 48, which gives 20 grains as the count of the required thread. This method applies to all fixed length counts, whether grain, denier or other system, it being necessary in each case to reduce all counts to the same basis.

For fixed weight counts, the calculation is slightly more complicated, but presents no great difficulty, provided the principle is clearly understood. This can be best explained by a few examples.

1. Let us suppose that a 2-ply is made up of 12s and 6s. Find the resulting count. Calculating the weight for any convenient length, say 12 hanks, we have

12 hanks 12s	=1 lb.
12 hanks 6s	=2 lbs.
12 hanks 2-ply	=3 lbs.

As 12 hanks of the 2-ply weighs 3 lbs., the count of the hanks per pound is $12 \div 3 = 4s$. Resulting count.

2. If it is desired to know what count must be twisted with a known count, say 12s, to give a 2-ply, say 4s, any convenient length, 12 hanks for example, is taken as a basis and the calculation made as follows:

12 hanks 4s (2-ply)	=3 lbs.
12 hanks 12s (known count)	=1 lb.

Difference to be made up by second thread.. 2 lbs.

Twelve hanks of the second thread must weigh 2 lbs., and the count must consequently be $(12 \div 2) 6s$.

Another method of making these calculations for 2-ply is as follows:

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1. Product of single counts $\div$ Sum of single counts = Resulting count. $(12 \times 6) \div (12 + 6) = 4s.$

2. Known count $\times$ Resulting count $\div$ Known count — Resulting count = Required single count. $(6 \times 4) \div (6 - 4) = 12s.$

For three or more ply the calculation is based on the same general principles, being varied to suit the particular case. Thus:

Ex.—What is the size of a 3-ply made of 60s, 36s and 45s, fixed weight count? Taking 180 hanks as a convenient basis we have:

180 hanks 60s	= 3 lbs.
180 hanks 36s	= 5 lbs.
180 hanks 45s	= 4 lbs.
180 hanks 3-ply	= 12 lbs.

180 (hanks) $\div$ 12 (lbs.) = 15s (hanks per lb.), Resulting count. Ex.—What count must be put with 60s and 36s to make the 3-ply equal to 15s? Taking 180 hanks as a convenient basis we have:

180 hanks 3-ply (15s)	= 12 lbs.
180 hanks 60s = 3 lbs.....	
180 hanks 36s = 5 lbs.....	8 lbs.
180 hanks third strand.....	4 lbs.

180 (hanks) $\div$ 4 (lbs.) = 45s (hanks per lb.), Count of third strand.

The results of these calculations are the same regardless of the length taken as a basis. Thus 180, in the last two calculations, was taken because it is easily divisible by the respective counts.

Warmth of Cotton Garments

In night clothing for children, which would be warmer, bleached or unbleached cotton? Give the reason for the conclusion reached. (3268)

The warmth of a garment is dependent upon the number of air cells that it contains, air being a non-conductor of heat; consequently the greater number of air spaces it is possible to

weave into the goods, the greater the warmth the fabric will have, in comparison to a fabric of lesser thickness, but woven with the same kind of yarn. It is for this reason that flannels, cotton or wool, woven of soft yarns have greater warmth than other fabrics of the same weight, but woven of harder yarns. It is to be doubted whether bleached or unbleached cotton will have any advantage over the other, provided the goods have no dressing. If unbleached cotton cloth is thoroughly boiled out, and freed from oils and waxes natural to the fiber, other conditions being equal as to count of yarn and weight of fabric, the apparent warmth should be the same. Anyone interested in this subject should read the article "Testing Blankets for Heat Transmission," in the June 16, 1917, issue of TEXTILE WORLD JOURNAL.

Stock Sticking to Spinning Rolls

We are troubled in our spinning department with some $\frac{1}{4}$ blood stock (white top), which constantly keeps lapping around the iron roller. Grease seems to accumulate on the bottom roller and this picks up the thread and takes it around with it. Can you offer any suggestion to remedy this?

(3145)

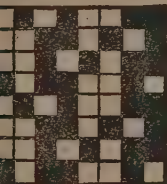
It is our opinion that the stock is coming gummy from the scouring room and this should be remedied first of all. A spinner suggests putting some kerosene oil on the top rolls which will help to loosen the gummy substance from the bottom rolls and can be cleaned off very easily. He recommends applying the oil three or four times a day until the rolls are thoroughly cleaned, and after that once or twice a day.

A manufacturer before whom the problem was laid offers the following:

The trouble may arise from the stock being too heavily oiled or containing a portion of its natural grease. This, in connection with a low grade of wool oil will be responsible for the rolls gumming. If the wool contains a portion of its natural grease there should be used a very light emulsion. At any rate it seems advisable to use less oil and more water in oiling the stock for picking. The draft in spinning may be too short, causing the ends to draw out from under the rolls. In this case the stock will naturally lap the roll if the temperature is not kept up to a point sufficient to keep the rolls warm. The mule may be drawing too slowly; better results are obtained in spinning this class of stock if it is drawn rather fast.

Weave to Imitate Knit Fabric

Enclosed find sample of knit fabric which I want to imitate in a woven fabric showing a rib on the face and a plain back. I wish to use about 2,000 ends in the warp and have the cloth 57 inches wide finished, with about 26 picks per inch, finished. The weight is to be 18½ to 19 ozs. per yard. Kindly send me two or three weaves to use in making sample ends. I think a regular rib weave will do. It is not really essential to have the plain back but with it the imitation would be better. (3254)



We think the weave shown herewith will make a good imitation of knitted cloth. It will allow for an appropriate construction to obtain the desired weight of cloth and cover of wool substance upon the surface. It is a through and through rib, on an equally balanced plan—namely two threads weaving cross and inverted cross alternately, tacking perfectly at each change. There are four harnesses up and four down on each pick.

Streaks in Cotton Fabrics After Wetting

In a certain process we find it advisable to wet fabrics without washing them, and it is sometimes necessary to leave them in a wet state for several hours. We find that where they lie in piles in this condition they are apt to become streaked or turn yellow in spots, particularly in fabrics made from natural yarns which have not been processed in any way. It occurred to us that there was some chemical that could be added to the water in wetting these fabrics, which would overcome the tendency mentioned above, but we have been unable to get any information along this line. These goods referred to are not washed, but simply wet. We have a method of forcing the water through the goods that wets them thoroughly and extracts the water immediately, so that it is not possible for us to use any method of preventing streaking which would ordinarily be adapted to goods which are being put through a regular washing process. It occurred to us that we might use some chemical in the water which we force through these goods, which would have a tendency to kill the streaking effect of the natural oil in the cotton, as we take it for granted that the streaking comes from this cause. (3282)

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It is very evident that the objectionable stains complained of are, as stated by the correspondent, the result of vegetable oil from the cotton seed particles present in the yarn. Replying to the specific point as to whether or not there is some chemical that could be used in the water for the wetting out process to prevent such stains, it is very probable that the relief sought will be given by mechanical rather than by chemical means.

It is commonly known that cotton in the natural state is very impervious to water, and therefore difficult to thoroughly wet out with water alone, except at a high temperature, or when under pressure. Such high temperature and pressure, while wetting out the cotton more rapidly and thoroughly, at the same time have a softening influence on the cotton. The crude oil frequently bleeds into the layers of cloth with which it comes into immediate contact. The substance causing such a stain is very susceptible to atmospheric influence, and if left in the wet state, even for a comparatively short time in piles exposed to the atmosphere, will rapidly oxidize and form permanent brownish stains.

In the absence of any information as to the mechanical method employed for wetting out the goods, the elimination of the trouble would seem to be along the following lines. First, maintaining as low a temperature of the bath as possible. Second, avoid passing the material through squeeze rolls or wringing machine for the purpose of extracting the superfluous water. To carry out the first suggestion the enquirer can use about 3 per cent. of soluble oil in the wetting out bath, which will aid the impregnation. For carrying out the second suggestion we would use a hydro-extractor for getting rid of the superfluous water.

When a batch of goods has of necessity been left for a considerable time in the wet state, the writer has frequently found it a very good practice to cover the goods with wet cloths, to prevent partial drying out at the outer surfaces of the batch, which would invariably cause streaks or stains.

As a remedy for the trouble after it has occurred, the following treatment will in most cases enable the manufacturer to market the stained goods as firsts. The stained goods to be treated are first boiled in a bath made up with 4 to 5 per cent. sal soda, boiled for 30 minutes. The water is then run off and the goods thoroughly rinsed in cold water. The bath is again made up with 2 per cent. sulphuric acid, and 2 per cent. muriatic acid, heated to 120° F. The goods are handled

in this bath for 30 minutes, then thoroughly rinsed in three successive waters, the first two cold, and the last heated to 110° to 120° . The warm bath is for the purpose of removing all traces of acids. It is usually advisable to supplement this treatment by giving the goods a light soaping, using 2 per cent. of soap, raising the temperature to 130° . The goods may be taken direct from this bath, extracted and dried.

Causes of Weak Cotton Yarns

A 30s warp yarn we are making is breaking below standard and we are interested in knowing what will increase the strength. The lap is 12 ounces; card sliver weighs 45 grains; 1st drawing weighs 46 grains; 2nd drawing weighs 50 grains; 70 hank sliver; 175 hank intermediate; and 5.75 hank speeder. (3160)

The enquirer does not say anything about the amount of twist in the yarn. It may be that he is figuring the twist with the ratio of whirl to cylinder as given in the catalogs of machine builders. The proper way is to find out what the ratio really is. This can be done by marking a spindle and also the driving pulley, and turning the pulley around once, counting the number of revolutions of the spindle. This should be done several times with different spindles and the average taken for the ratio.

The size of the band changes the ratio considerably the larger band revolving the spindle slower than the smaller band. The larger band does not go down as deep in the V-shaped whirl, which consequently gives the effect of a larger whirl. Perhaps the wrong ratio is being figured and the standard turns of twists per inch for No. 30 yarn are not being put in.

The cotton fiber that is used may be of an inferior grade. The twists or convolutions are not as numerous in half ripe fibers and are almost lacking in unripe or immature fibers. Poor varieties have fewer convolutions than the better varieties.

From the information given it is possible to calculate only the drafts of the work. With the exception of the card, they are not too long. The draft of the card may influence the strength of the yarn. It is not necessary to run such a long draft in this case. By slightly lengthening the drafts in the processes following the card, better work can be obtained.

Some mills run longer drafts, which is all right if their grade of work will stand it and the fibers are not injured,

The longer the draft the longer the fibers are held by the bite of the feed roll and the longer the fibers are exposed to the action of the lickerin. One of the functions of the lickerin is that of combing and straightening the fibers. As long as the feed roll holds the fibers they are combed. Then the feed plate should be of proper dimensions. The distance from the bite of the feed roll to the lower edge at the point where the teeth of the lickerin are nearest to the face of the plate should be from $\frac{1}{8}$ to $\frac{1}{4}$ inch longer than the average length of staple being worked, otherwise the fibers will be broken by the lickerin teeth, which take the fibers away before they are liberated from the bite of the feed roll. The angle of the face of the feed should be such as to cause the teeth of the lickerin to comb the fibers for about two-thirds of their length before they become detached. From this it can be seen that a shorter draft shortens the time the lickerin has to act upon the fibers, causing less broken, injured or strained fibers.

Some of the defects that influence the strength of yarn are pointed out above, but it would be impossible, with the information given, to say exactly what the cause is in this case. It would be advisable to shorten the draft on the card; the other processes are not overdrafted. The drawing would be better if it was not drafted much over six.

Flow Meters in Textile Industry

What are the uses of flow meters for steam, water, air and gas in the textile industry? (3155)

Flow meters, of course, will find all the applications in textile power plants that are found in general power plants. The meter will be used to measure the quantity of water fed to the boilers; it will be used on the steam line from each boiler; it will be used to measure the steam used by the engines, etc. In addition it will be used to measure the quantity of steam used by the heating system; to measure the quantity of water returned from the heating system; to measure the quantity of steam and water used in the dyehouse, bleachery and in various finishing processes. Where exhaust steam is used from the engines in the dyeing, bleaching and finishing departments, etc., meters would be useful to find the charge for steam to these departments so that an accurate charge could be made against them. It is a question whether it would be any gain to put a meter on the air lines and the gas companies install their own meters for measuring gas.

Throwing Canton Silk

I would like to use some Canton silk for tram for certain fabrics, but am afraid that it would be too hairy if thrown in the usual way. What sort of results would be got if instead of throwing this into say 3 thread tram, in the usual way, with about three turns of twist per inch, it should be thrown into 2 thread tram with three turns of twist to the inch, say right hand, and then a third thread joined to it, and given three turns of twist to the inch, left hand. Would this treatment help to close up the thread and make it closer and firmer? (3150)

No; in fact it would not be so close, because the second time twisting would take out the twist put in the first time, and the thread so treated would simply be the two ends untwisted, lying side by side with the third thread looped around them three turns to the inch, and this would be even more open than the ordinary tram. A closer bound thread can be got in the following way:

Double two threads and twist them in one direction, say six turns per inch. Then join in the third thread and twist it the opposite way, say three turns per inch. We now have in effect a two-thread tram twisted with three turns to the inch, and looped around this in the reverse direction a third thread with three turns to the inch. This will give more coherence to the individual threads than would be the case with ordinary tram, and without in any sense twisting the threads too tightly; but, of course, it will cost more in the throwing.

Whether it would be too hairy for the enquirer's purpose could only be determined by trying it out, bearing in mind, of course, that some of these silks are much more hairy than others. But a comparison of some silk twisted this way with some silk of the same lot twisted the ordinary way, both being dyed in the same bath, would afford pretty conclusive proof as to the advantage or disadvantage of it.

In case it was desired to use canton for organzine, a twist of $18/10$ turns per inch could be tried instead of the ordinary $16/14$. In terms of single thread the twist then would be $18 + \frac{1}{2}$ of 10 (equal to 5), total 23. In the case of $16/14$ the turns of twist, in terms of single thread, would be $16 + \frac{1}{2}$ of 14 (equal to 7), total 23, so there is no more twisting to be done by the throwster. When thrown $16/14$ turns, as the reverse twist takes out first-time twist, it leaves only

two turns of first-time twist in the single threads, with 14 turns of second-time twist. Where the silk is thrown in 18/10 turns, there will be eight turns of twist left remaining in the single threads, and ten turns in the two-ply, which should be an immense help in minimizing the hairiness natural to Canton silk.

Other twists than these will doubtless suggest themselves to the enquirer, but I think the above suggestions for tram and organzine would be promising directions in which to work. If in the case of tram six turns first-time, with three on the reverse, does not give coherence enough, he might try ten turns first-time and say five on the reverse, so that all three threads will have five turns of twist in both the single and the three-ply.

Marking Cloth for Dyeing

In our dyeing of rolls of knit cloth in the piece we use a small marking tag made of cotton cloth on which we mark with indelible ink the style number, etc. When we employ deep shades this marking is, of course, not legible. Is there any way of treating this cotton marking cloth to make it resist the action of the dyestuff? Possibly you can suggest some better method of marking than the one we use. We use all direct cotton aniline colors. (3144)

It is doubtful if a method for marking cloth such as is here described is available, since the direct colors when dyed in heavy shades will "cover" any sewed-on numbers. There are some direct dyes that do not dye or stain wool, and if such are used, of course, the number could be sewed on with a hard twisted worsted yarn. A trial along this line might be to advantage.

There is on the market a kind of stiff cloth that comes in various forms and which permits numbers to be perforated through it by means of a machine. It is much used by large mills, also by garment dyers for identifying different items put into the dye bath. The cloth, in the form of small labels, holds its stiffness, and the perforated number is at all times quite legible.

After the publication of the above a reader sent the following:

I have read with interest, reply to question No. 3144 on marking cloth for dyeing. I have found the following process to give good results in marking knit goods: Take Demar

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varnish and dry aluminum powder, such as plumbers use for painting radiators, and mix as you would paint in the following proportions:

½ pint varnish
2 ozs. aluminum powder
Mix thoroughly.

Apply this mixture to the knit cloth and let dry. The cloth can then be dyed black and the figures or lot numbers will be plain. In applying this mixture use a blunt piece of wood for a brush, rubbing on hard. The Varnish will not wash out with boiling water and the aluminum powder, being a metal, will not dissolve. I have used this method of marking cloth to be dyed black for the past thirteen years.

Knitting Silk Plated Coats

We want to make up a worsted and silk plated knitted garment that can be brushed and will have the appearance of a silk coat with the desired luster. Can such a coat be made on a five gauge machine? (3258)

We think the inquirer means either a 4 or 6-cut machine instead of a 5-gauge, as in this kind of work the cut is mentioned instead of the gauge. A silk plated coat can be made by using silk with very little twist. Have the brushes on the brushing machine very sharp and set at the proper angle, because the machine will draw the silk if it does not cut it. In brushing the goods the backing is liable to show through if the plating is not heavy, and in that case the inquirer will have to use extra ends to each feed. Be sure and have the cams on the knitting machine ground true and the machine properly adjusted.

Combing South American Wools

I would like some information on combing low ¼ blood Buenos Aires and Montevideo wools. What weight for 10 yds. would you put up to the comb? This wool acts very wild and causes laps. What size and length of pins would you have for the circles? Which is better, a long or a short pin? Would you use emulsion on the sliver or would you put on pure olive oil; would the oil make it better (not so wild)? (3146)

The trouble the enquirer complains of is probably due to the scouring. Wools of this nature should be scoured with as little alkali as possible, or if the soap contains some, it should

be scoured with soap alone, which will leave the wool softer and better to handle in the carding and combing processes. There should be about 25 per cent. moisture left in the wool before carding, and about 3 per cent emulsion put on the gill box before combing, and the stock should be run through the gill boxes twice.

A worsted comber and spinner states that he would use an emulsion instead of oil on these wools as they are naturally very slippery and the oil will make them more so. Whether the tops are to be dyed or not, they should be properly treated for the combing process, and then if it does not work satisfactorily in drawing apply more oil in the double can box.

Thirty pins per inch in the large circle with $1\frac{3}{4}$ inch pins, and 32 pins per inch, $1\frac{5}{8}$ inches long for the small circles, is a very suitable set. The sliver weighing from 15 to 16 ounces to 10 yards ought to suit these wools very well.

One of our English correspondents replies to this question as follows:

I would advise a weight of 15 ounces for the 10 yards. If the stock draws freely either the weight can be increased or the speed of the comb increased. If 15 ounces has a tendency to cut or pluck reduce the weight slightly. In dealing with South American wools it must be borne in mind that much of it is taken from dead sheep and naturally does not contain as large a percentage of suint as clipped wool. Therefore, if great care is not taken in the scouring process there is a tendency to wildness and waste, besides a loss of time due to the combs stopping for removal of laps. If the sud is too hot or the scouring liquor too strong there is taken from the wool that which neither oil nor emulsion can replace.

Do not strive too much after a good color in the scouring; leave this to the backwashing, especially if the old plan of backwashing before combing is carried out. In this case lower the temperature of the drying cylinders a little so that the stock comes off slightly more damp than with ordinary wools. By the time the stock has passed through the gills and punch box it can be worked without danger of cutting. It will be found that when the comb has stood, say for meal time, a slight damping with water helps the slivers.

If the stock is backward after combing a damping roller on front of the gill box before punching can be used to advantage to get a proper amount of moisture on the stock for combing.

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The following is a specification for a good set of circles for low quarter blood:

LARGE CIRCLE, PINNED OVER $3\frac{1}{2}$ INCHES

ROWS	PINS PER INCH	SIZE OF PINS
1	24	13x22 flat
2	23	14x22 flat
3	22	14x20 flat
4	16	16x20 flat
5	14	14
6	11	12
7	8	10
8	7	7

Pins 2 inches long.

SMALL CIRCLES, PINNED OVER $\frac{3}{4}$ INCHES

ROWS	PINS PER INCH	SIZE OF PINS
1	26	14x22 flat
2	26	14x22 flat
3	23	13x20 flat
4	13	14 round
5	10	10 round

Pins $1\frac{7}{8}$ inches long.

The only argument in favor of long pins is that they allow for a heavier weight of stock to be put into the circle without its being hard packed. There is, however, a serious disadvantage, i. e., by lengthening the pin it is weakened and the pins have a tendency to spring out of position just when the rollers are drawing out of the circle, allowing the neps, etc., to pass through, thus producing a dirty sliver.

To prevent the sliver drawing over the points of the pins, put a thin steel knife, either between circle and roller or dipping just below the points of the pins in the front chamber of circle. This knife must be at exactly the same radius of circle or it will result in worn pins.

If the enquirer is partial to emulsion, the following is a good recipe:

2 parts pure Gallipoli oil
1 part mixture made from
20% water
13% glycerine
1% potash

(Use no more potash than will just make water and glycerine mix.)

Pure olive oil, by helping to retain the moisture, certainly cures part of the wildness.

I would advise putting on about 8 drams of oil to the pound of stock that is not to be dyed and 6 drams to the pound of top that is to be dyed.

Poor Black on Cotton Plush

We send some of our cotton plush goods to an outside dyer to be dyed black after they have been finished by us in the usual manner, and they are returned with a slaty-looking cast over the whole surface, looking at them with the pile. Some time ago we had some pieces done by the same dyer which did not show this defect. He tells us that he uses the same process and dyes now as before, which is rope fashion dyeing with direct black and topping afterwards with blue. He renews his dye bath after every lot and cleans out the dye tanks properly, and also assures us of not using too much salt. Therefore, we do not believe there is a reason for any surplus salt precipitating on the pile, this sometimes being the reason for causing the slaty appearance to pile goods. Could you tell us what your opinion is of the above mentioned defect?

(3162)

If the cotton plush has a slaty appearance instead of a full black, this should be sufficient evidence that not enough dye-stuff has been used in the bath. It stands to reason that if two separate lots of identically the same goods are dyed at different times, and under the same conditions, with the same proportion and kind of dye, and in the same dyehouse, there is no excuse for the difference complained of appearing. The conditions being the same, the cause of the trouble should be looked for elsewhere.

To obtain the best results with direct or substantive dyes upon cotton plush, it is necessary that the goods should be thoroughly wetted out before going to the dyehouse, and for this purpose a small quantity of soluble oil should be invariably used. This treatment removes from the cotton those natural impurities of the cotton which, if allowed to remain, simply act as resists to the dye, and thus may be at the bottom of the trouble complained of. It is not possible, as suggested in the question, that too much salt has been used in the dye-bath, since an excess of salt would not precipitate on the fibers, but, on the contrary, would probably cause precipitation of black dye which would appear as a distinct bronziness on the goods.

Use of Copper Sulphate

What is copper sulphate used for in the textile industry and what amount is used annually for dyeing and other processes? (3157)

There is no way in which we can obtain statistics on this product. Its use is practically limited to the after-treatment of certain cotton colors and in the production of oxidized aniline black. As practically none of either class is being made at present, the use of copper sulphate must be quite limited. In Germany copper sulphate is employed as an antiseptic in sizing, and this is a use which might be developed.

Nibs in Carding Wool and Cotton Mixture

I am working on a fine Australian wool and American cotton mixture (45 per cent. wool and 55 per cent. cotton). I am troubled with the cotton nibbing. I have tried several things but still the nibs are there. Do you think putting the liquid on the wool separately, putting it through the picker once, then mixing the cotton with it, and putting through the picker together, would be of any benefit? My liquid mixture is as follows: 7 pailfuls of lard oil to 8 pailfuls water; 4 quarts of soda, using 11 quarts of this mixture per 300 lbs. of stock. The cotton just goes through a Sargent duster three times. We have no cotton cleaner and no breasts on our cards, just the burr cylinder. (3176)

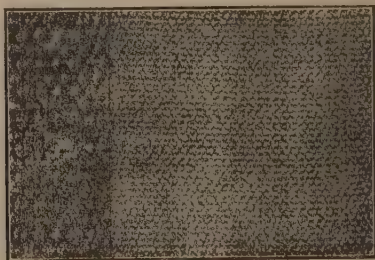
In picking and oiling cotton and wool mixes special care should be taken to keep the cotton as free as possible from the oil; if the oil or emulsion comes in direct contact with the cotton it will cause nibs in carding. A good plan is to oil the wool down and run it through the mixing picker, then previous to picking again lay it down, first a layer of wool and then a layer of cotton, until the entire batch is laid down, running the lot through the picker twice to insure a good thorough mixture. In feeding the picker the stock should be taken from the top down through to the bottom of the pile.

As a rule the amount of oil used in cotton and wool mixes of the proportions mentioned is reduced to about one-half of the amount used on wool. It seems advisable to reduce the amount of oil to 6 pailfuls of oil to 8 pailfuls of water. Mix into a good emulsion and use about 3 quarts to 100 lbs. of stock. The top work of the cards should be set down as close as possible on fine cotton mixes to prevent nibs. Fine set wire is also an advantage in this respect.

Details of Narrow Webbing

Find enclosed two samples of tape on which I have been asked to figure both as to cost per yard and production per space from the loom. I realize this is hardly an article for a silk ribbon mill, but if you can give me the construction and the approximate cost I shall be grateful. (3187)

The sample of tape webbings submitted are such as are being called for exclusively by the United States Government for purposes where leather was formerly used, and must for this reason be heavy and firm and yet flexible. The requirements in weight and tensile breaking strength necessitate the



$\frac{5}{8}$ -INCH

$1\frac{1}{2}$ -INCH

MILITARY WEBBINGS

use of machinery of the very heaviest type made. The loom frames and driving shafts must be heavy and there should be a sufficient number of lay arms used so as to rigidly withstand the heavy beat at the front reed. In fact, the main difficulty experienced in manufacturing these goods is altogether one of weight.

Any ribbon loom of about 24 or 30 shuttle capacity and proper reed space, of heavy construction, might easily be changed over to meet all other requirements. A warp creel made for six warp beams in each space will be necessary, so as to accommodate a proper division of the warps, which must be arranged in small sections in order to be able to weight all the threads uniformly, so as to allow them to respond properly to the different harness movements. A separate warp will be required for the selvage, one for the filler

and one for the binder, which connects the upper and lower cloths together.

The shuttle quill space must be large enough to accommodate a good sized quill, otherwise the spool will require replenishing too often. Very heavy shuttle springs will have to be used, in place of the light ribbon springs generally employed.

The weave and general character of the fabric is of the simplest kind, but on account of the unusual thickness and weight of the goods, there are a number of details peculiar to these requirements which involve conditions somewhat difficult to overcome. But the effort is worth while, inasmuch as large contracts at very attractive figures are yet to be placed, and sufficient suitable machinery has been hard to find.

The $\frac{5}{8}$ " (.63") tape submitted contains altogether 60 threads of 10/5 yarn and the weft is the same size.

The warp sections are divided as follows:

Selvage	13 ends
Face	16 ends
Back	16 ends
Center	10 ends
Binder	5 ends

The reed used is 12 dents per inch and should be a very heavy soldered reed. There are 32 picks per inch.

The average price paid for weaving in the several mills engaged on this class of goods is 35 cents per 100 yards. The material used all being 10/5, and the weight one ounce per yard, the cost can be easily determined.

The construction of the $1\frac{1}{2}$ inch sample submitted is as follows:

Selvage	17 threads.....	20/2
Face	56 threads.....	20/2
Back	56 threads.....	20/2
Binder	29 threads.....	16/2

The weft is 16/2, the reed is 18 per inch and the picks 52 per inch. The average price for weaving is 40 cents per 100 yards.

The weight called for in the Government specifications is .64 oz. per yard. This is one of the lightest of the group of these goods and perhaps better adapted for ribbon looms than any of the others.

Making Slippery Floors Safe

You may have had experience in the best means to overcome slippery floors that are more or less saturated with oil and are in dangerous proximity to moving machinery. In this case we wish you would give us your experience, and write to us personally on the subject. While sand would be effective, yet the fact that this would more or less work its way into the goods would prevent its use. We believe there must be some chemical solution that we could sprinkle on the floors that would counteract the slippery effect from the oil-saturated wood.

(3192)

Floors can be kept free from oil if proper installation methods are carried out, and prevention is easier than cure. When machines are installed, sheet iron can be fastened to the floor and the machine set over it. This iron needs to be put under the machine only where oil is likely to fall. It need not project out more than 6 inches from the machine frame. All joints should be soldered. It used to be the custom to use zinc sheets, but iron is now used as a substitute.

Where oil is likely to be thrown out by revolving parts guards or oil collectors can be installed. If the oil is wiped off the sheet daily or whenever an excess collects, there will be very little on the floor.

To remove the oil there is nothing so efficient as hot water and caustic soda. This can be used on Saturday afternoon and the floors will be dry and safe on Monday morning. Too much water should not be put on the floor at one time as it is liable to get in the cracks and start rot. Sand or any other such substance is only a temporary treatment and should not be used. If regular use of the hot water and caustic is resorted to a great difference will soon be noted.

Tender Cross-Dyed Yarn

We are enclosing herewith a sample of black combination yarn which is tender. The cotton was first dyed sulphur black in the skein then twisted with worsted. The worsted yarn was then dyed black. Can you tell us why the yarn has become weakened? It was strong before the second dyeing.

(3193)

In dyeing cotton with sulphur black certain reactions occur in the dyebath which have never been positively explained. The use of ordinary sodium sulphide and the dyestuff itself causes the separation of sulphur during the dyeing operation.

When the bath contains matters extracted from the cotton, instead of this sulphur separating as a curdy mass it assumes what is known as the colloidal condition, and is taken up by the cotton in a form that is not visible to the naked eye and which is not removed by the most thorough rinsing.

The use of caustic soda in the dyebath will do much to prevent the separation of sulphur and is often used with great success. When cotton dyed with sulphur black is finished in the manner of hosiery with oils, soap and alkalies the action of these prevents any further change in the sulphur, but when mercerized cotton dyed with sulphur black is scrooped by means of weak acids, like citric, tartaric or lactic, the acid conditions seem to favor an oxidation taking place and the sulphur becomes sulphuric acid, which of course tenders the cotton.

Naturally the operation of cross dyeing the wool, in the yarn referred to, would give an acid reaction to the cotton and tend to favor the oxidation of the sulphur and the tendering of the cotton. It might be contended that many rinsings had followed the dyeing, but there have been instances of cotton waste dyed with sulphur black which not only became tender but actually caught fire spontaneously in the dryer. The stock being removed from the dryer was thoroughly washed with soda ash and soap, then rinsed, and again caught fire.

It does not seem possible to remove these peculiar sulphur effects by any amount of rinsing, the only remedy is to correct the trouble in the dyebath. This can be done by selecting a sulphur black which does not contain an excessive amount of sulphur, by the use of a sodium sulphide free from excess of sulphur, and by the use of a liberal quantity of caustic soda in the dyebath.

Purifying Dye House Waste Water

We are dyeing sulphur and direct colors and rinsing same, discharging about 4,000 gallons of water per day. Is there any simple means of filtering or clarifying this water, so that it could be discharged in side ditches without being objectionable? We have had no trouble but if we could clear the waste water up by some simple or inexpensive means would like to do so. Is there some chemical which would precipitate the coloring matter left in the water, or could it be filtered with sand satisfactorily?

(3206)

The quantity of waste dye water from this mill is small, and for its purification no great amount need be expended,

although on a small scale purification is never as complete as when the operation is carried out on a large scale.

For the present instance, it might be sufficient to provide several tanks or vats large enough to hold the waste for one day. The waste dye liquors could be then run into these vats as the kettles are emptied. To the contents of each of these vats add a sufficient amount of milk of lime and of a solution of copperas. The amount to be added will have to be determined by a few trials upon a laboratory scale. When these chemicals are added, decomposition of the dye liquor takes place, and, as a general rule, the usual excess of sulphide of sodium is decomposed and the excess of coloring matter in the liquors precipitated in the form of a sludge, together with the oxide of iron from the copperas. This sludge must be drawn off and allowed to collect in sluices or on coke fragments, or shavings, mats, or on other bottoms that are cheap or otherwise readily procured and replaced. The water that runs off from these bottoms is usually clear, or at most slightly tinted, but without any perceptible odor.

Where the quantity of waste water is large, the problem of clarifying it is serious and interesting. The case outlined by this correspondent is trifling when compared with some waste water purifying plants.

Space for an Underwear Plant

Please inform me what floor space is necessary in an underwear mill to produce 40 to 50 dozen per day of ten hours.
(3197)

This is a difficult question to answer as the inquirer fails to state what kind of goods he intends to make, whether two-piece suits or unions. It would make a great difference in the machinery required whether flat or ribbed goods were to be made, whether winter or summer weight, and whether men's, women's or children's sizes were to be made. We will assume ribbed goods are to be produced. We will also assume that men's union suits are to be made weighing 16 pounds per dozen.

The floor space required for this production, for manufacturing purposes, outside of storage, would be about 800 to 900 square feet. This figure could be cut in half if the production were 40 to 50 dozen per day of two-piece goods.

Dyeing Cutch on Cotton Cloth

I take great pleasure in reading your Questions and Answers page and would like to have you answer the following question: This question refers to a brown dyed on bleached cotton cloth with Cutch extract at 51 deg. Tw. and developed with bichromate of soda and bluestone. One hundred pounds of cloth dyed as follows on jigs. Five ends boiling in first jig using 12 per cent. of dye. Developed in second jig with 1-8/10 per cent. of bichromate of soda and 1 per cent. bluestone, 2 ends, warm. The dyed cloth when run over the sprinkler for calendering dusted out badly. What was the cause?

If this dye had been frozen or had been standing for any length of time, say two or three months, in a warm dry room, uncovered, would this have anything to do with the dusting out of the dye? If logwood extract 51 deg. Tw. has been frozen, are its dyeing qualities affected? (3209)

The proper method for dyeing Cutch on cotton is to have the cloth well boiled-out, or de-sized, by any of the approved methods that are current today. These methods are either kier boiling, wetting-out with soluble oil, a method very effective for many classes of goods; or by means of malt. This latter process is gaining in extent of use, and leaves nothing to be desired so far as cleanliness of the goods is concerned, as it leaves the cloth in a condition favorable for dyeing.

As to the Cutch process. Cutch is dyed by preparing the bath with dissolved Cutch extract and adding to the bath a small quantity of Bluestone, the usual amount being about 10 per cent. of the weight of the Cutch known to be required for the given shade. In this case, for 100 pounds of cloth, requiring 12 pounds of Cutch, add 1¼ pounds of Bluestone, and then give the cloth whatever number of ends are necessary for the shade. After the shade has been obtained transfer the rolls to a second jig prepared with a solution of two pounds of Bichromate of Soda and give several ends while the bath is at the boil. This boiling appears to be necessary for the proper fixation of the color.

There appears to be nothing wrong with the formula used by this correspondent, except that the Bluestone is used in the wrong place. Always use the Bluestone with the Cutch, and fix with the Bichromate alone in a separate bath, and boiling, *not warm*.

Frozen extracts are injured. Where the extract has only been thoroughly chilled, or where icy slush has formed in the

barrels, there is no real injury, but when the contents have frozen solid and remained in that condition for a long time, as might have been the case during the past winter, the extracts are of little value.

As to the dusting-out of the color in the pieces complained of, the cause appears to be due to the fact that the dye was not properly fixed on the cloth during the dyeing operation.

Feathers in Textiles

In your issue of March 11, 1916, and June 10, 1916, "Hawick" discusses the use of feathers in textiles. We are sending a sample of the kind of down that we produce. Do you know of any mill or mills that use this material?

(3165)

The only feather yarns that have been manufactured in this country, to our knowledge, were manufactured at the Lowell (Mass.) Textile School by Mr. Edgar H. Barker, head of the wool department, for a New York feather concern, as a result of the publication of the articles you mention. It is possible that Mr. Barker has pursued this question further than we have, and we would recommend your getting in touch with him. So far as we know, there is no concern using quantities of feather yarns in regular lines. There is no reason why feather materials could not be used in textiles to get special effects, but it would probably take considerable pioneer work to introduce the material.

Unsatisfactory Drill Construction

We are enclosing a sample of drill, which material we think is too tender in the width and would like to have your opinion regarding this.

(3148)

The construction of the fabric in question is 68 threads of 15s carded warp and 40 picks of 24s carded filling. The warp is a good, well spun yarn of suitable twist, but the filling has very little twist, which with the low number of picks accounts for the lack of strength. Not knowing what break is wanted, we cannot advise whether the results are satisfactory, but if the picks per inch are arbitrary and a stronger fabric is wanted, the filling certainly must be made stronger, either by making a heavier filling yarn, using better stock, or giving the filling yarn more twist. The construction of 68 ends of 15s warp against 40 picks of 24s filling is out of proportion.

Bleaching Merino and Silk Fabric

Is there any way in which we can bleach a merino and silk fabric without dimming the luster of the silk? For example, we make a fabric with every other thread of merino and every other thread silk. We bleach this fabric in batches of 250 pounds in 250 gallons of water, heated to a temperature of 110 degrees. We use 7 gallons of peroxide and $\frac{1}{2}$ gallon of silicate. When these goods are finished, there is very little luster to the silk; in fact it does not show up much better than a mercerized cotton. (3183)

The proportion of silicate of soda seems to be too great for the amount of peroxide of hydrogen. The actual amount of silicate necessary for the work should be only sufficient to make the bleach bath slightly alkaline in reaction. Do not add the silicate to the bath unless it is first diluted with water, and then add it only in such quantity as will show a slight blue tinge to a slip of red litmus paper. Always make use of both the red and blue litmus paper when making up the bath. The addition of the silicate is for the purpose of neutralizing any free acid that the peroxide contains.

After bleaching to the proper degree of whiteness lift the goods, allow to drain back into the bath and then rinse the fabric in water containing a slight amount of oil of vitriol for the purpose of removing the last traces of silicate. It is the remaining free alkali that impairs, without doubt, the luster and brilliancy of the silk in the goods.

Beating Cotton in the Picker

What is the requisite number of blows per inch that cotton of various lengths should receive in the picking room on the various machines, two and three-blade beaters and porcupine beater? (3175)

In order to give a practical answer, one must assume a certain layout of the work being run. We will assume that we are running $1\frac{1}{8}$ -inch stock through the breaker, intermediate and finisher pickers. Laps for breaker, 16 oz.; intermediate, 16 oz. Finisher laps should be 13 oz., four doublings on each picker, all of which have single beaters.

The body of stock delivered to beater would, in this case, be $16 \times 4 = 64$ oz. per yd. This is as heavy as it should be run. If about 50 oz. per yard, it would be all right for this stock. From 50 to 65 oz. is a very good range. Blade beaters

in this case should run from 35 to 40 blows per inch of stock delivered. For pin beaters it could be increased from 10 to 20 per cent., if stock were very dirty.

The main thing about picking is the air drafts. These should be so regulated that the stock will leave the beater blade quickly and spread evenly on the cages. For longer stock we use only breaker and finisher and aim to deliver about 30 to 40 blows to the length of stock delivered, if the sheet delivered is about 50 oz. to the yard. If the sheet is lighter we deliver fewer blows; and if heavier, more blows. We have found the curling of stock is caused more by not having proper draft than by too much beating. There is no doubt that excessive beating weakens the stock and causes excessive flyings in later processes.

Amount of Caustic Soda for Mercerizing

I am interested in mercerization as I am about to start a mercerizing plant. I have a work entitled "Mercerization," in two volumes, but fail to find the ratio of caustic soda used per pound of yarn mercerized. Can you supply this information? (3123)

Assuming that the strength of the caustic soda used by this enquirer is 64° Tw. (or 1.32 specific gravity, representing a strength of 28.83 per cent. dry caustic), each one hundred pounds of dry cotton yarn immersed in it will remove very close to 12½ gallons of the caustic liquor. This amount of liquor corresponds to 39.6 pounds of caustic soda, which should be replenished so as to restore the mercerizing bath to its original volume and strength. If another density is employed than 64° Tw., reference to a standard caustic soda table will give the corresponding strength for the other gravity. From the data above used as an example, the amount of caustic soda per 100 pounds of cotton is in the ratio of 39.6 of the former to 100 of the latter.

Regarding caustic soda tables. There are quite a number that have been published in various text books from time to time, but upon comparing them slight differences appear, consequently, for general mill use, we regard the tables published by the Solvay Process Co., of Syracuse, N. Y., as being the most convenient as well as accurate. No doubt a copy of these tables are to be obtained from the company upon request.

Tenderness in Wool Goods

I am sending herewith sample of cloth which is tender in the filling direction. The fabric is 56 inches wide and weighs approximately 12 ounces per yard. This is a style we have been making for years without having any trouble. Can you tell me what, in your opinion, is the cause of the tenderness? (3149)

It is evident that the main cause of tenderness is the poor quality of material from which the filling yarn is made. This seems to be a composition of B super pulled wool and an



equivalent grade of wool shoddy, estimated to be blended on a basis of fifty per cent. of the former and fifty per cent. of the latter. Threads extracted from the sample break abruptly and show loose, lifeless fibers, indicating that the felting properties are very limited. This is confirmed by the fact that the cloth feels flimsy and hard. These facts signify that the raw material was either originally deficient in strength or has been made so in the process of scouring, carbonizing or dyeing. Overboiling is a common cause of textile material being depreciated in strength.

Pulled wool is liable to be weakened by the lime used in the pulling process, and shoddy manufactured from a mixture of all kinds of rags is always an uncertain factor. Great care is required in preparing the stock to be converted into yarn, and it is a safe policy to make frequent and efficient tests of the tensile strength in the spinning of yarn. By so doing any

deficiency is discovered at the earliest opportunity and, of course, should be remedied immediately.

There is some ground for criticism in the construction of the fabric. While it is compact enough and probably could not be woven any heavier in the loom, the raw, bony feel indicates that the condition is not right. The weave is a common plain plan, one up, one down, excellent in itself, but requiring careful handling in the later processes of manufacturing. It is the tightness of weave that creates the character of fabric already described and the weight, being limited accordingly, fulling in many cases has to be resorted to in order to obtain the desired results in heaviness as well as in other respects.

Conditions of yarns being equal, a fabric woven with a plain weave resists the process of fulling more than any other, for the simple reason that the threads intersect more frequently. Therefore, in harmony with the same principle, the poorer the felting attribute the greater resistance. Consequently if this is prolonged some part must give way and, as it is demonstrated here in the sample of tender cloth that the separate threads of filling have little affinity toward each other, it is reasonable to suppose that such is a contributing cause of the weakness.

To improve the strength it is recommended to substitute twenty-five per cent. of fleece wool for the same proportion of the pulled sort. This will so reinforce the composition that the shoddy will be better carried through the carding machine and more competent yarn will be produced. Fulling will also be so facilitated that the danger of having tender cloth will be substantially reduced.

The fabric has been sheared a little on the face, which may be another contributing cause of the trouble, as a cloth of such a weight and quality of filling is not fitted to be sheared close down to the ground, and the operation under the present circumstances should be omitted. In this instance shearing is uncalled for and is detrimental to the appearance by reason of the silk noil warp showing up more bare and conspicuous. This is objectionable, and the purpose should be to clothe the bareness with cover from the black wool yarn rather than to shear it off. The plea might be advanced that then the goods would not match the original sample, but in such event the original and not the copy will be at fault, as it is a fact, recognized in the trade, that the goods delivered are sometimes better than the reference sample.

Boiler Feed Water and Steam for Processing

We have some settling tanks for water for the bleach house. We run the water from the river into these settling tanks; we put 50 pounds of lump alum in each tank containing 100,000 gallons of water.

We found the water from the river so bad that in boiling the knit cloth in a kier 5 to 6 hours, the steam and condensate from the boiler gave us a lot of mud stains, so we connected up one boiler with settling tank, so to feed one boiler which feeds steam to boiling kier with better water. The question is asked, will the alum in the water be any detriment to the boiler? It appeals to me that such a small amount of alum in 100,000 gallons of water would have no effect on the boiler, but I would like to have some outside opinion. (3189)

Fifty pounds of alum per 100,000 gallons of water will not be harmful to the boiler. It is a small quantity and will precipitate in the settling tank. Should a large quantity be used in lime water it would form a hard scale if fed direct to the boilers. If an open heater is in the line to the boiler feed pumps the scale would be thrown down in the heater, or form on the coils in a closed heater. The inquirer has no need to worry under the conditions he is using the alum. If the water contains other impurities he may get scale from them, but that will be known as no doubt he has used the water as boiler feed previously. It is possible that the stains in the kier are from the water and not from the steam.

Arrangement to Heat Boiler Feed Water

Can you give us any information in regard to the possibility of heating the feed water to our boilers by burning waste paper, broken boxes, barrels and odd lots of wood which accumulate around our property, together with any other wood which we cannot sell? The writer has in mind a sort of auxiliary boiler through which the feed water for the main battery of boilers would pass and into which water we would put as much heat as possible by the burning of waste material, etc. (3171)

We would suggest getting a second-hand fire tube boiler capable of standing the boiler pressure and passing the feed water through against the draft, that is, downwards if it be a vertical boiler and toward the back if a horizontal return tubular. Then whenever there was refuse to burn you would get the benefit of it and when there was none you would be none the worse off. It would be inexpensive and easy to install.

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If you cannot secure a boiler to stand the full pressure of the system, you can put the wood burner ahead of the pump and have no pressure on it at all, pumping hot water from it to the boilers. In such case the wood burner should be above the pump so as not to try to lift the hot water.

A mechanical superintendent replies to this question as follows: "The question really needs a plant and general condition analysis to arrive at a definite conclusion, but offhand, I would say that more B.t.u.'s could be reclaimed by burning the refuse under the boiler than in a preheater, as the extra radiation would be eliminated and quite a sizable outlay saved. I might add that extra care will have to be taken to keep the flues or tubes cleaned, but with the present day blowers available, that is not a difficult task.

"Another phase of the question would be presented if mechanical stokers were used; under that condition a preheater would be advisable if there is sufficient refuse to warrant the expenditure of the necessary amount of money to install such an outfit. I have found it very profitable to bale and sell the waste paper.

"If one is going into this question, too much attention and thought cannot be given to the design of the furnace and setting, as a spacious fire box and an extra large door opening must be provided; also the sparks and smoke must be taken into consideration. From my experience a return of about 50 per cent. of the B.t.u.'s in the fuel can be reclaimed."

Condensation from Roof

We have a new spinning mill, one story high, built of brick with cement floor. It is covered with a pitch roof of corrugated galvanized iron and has throughout metallic ceiling nailed to strips with building paper between. The building is heated with steam from radiators. We have had a lot of trouble with condensation gathering on the under side of the roof, then melting and dropping when the sun gets warm. The corrugated iron is nailed to purlin rafters on the roof and there is a distance of about one foot at the eaves to twelve feet at the center of space between the ceiling and the roofing. Could you tell us the best method to prevent this condensation?
(3178)

In cold climates a lot of trouble is caused through condensation from roofs. This may be increased owing to the metallic ceiling, as the roof will be chilled on the under side.

It may be advisable to open vent holes in the metallic ceiling near the walls and see if this prevents the condensation. One or two places could be opened as an experiment. Of course this will take away some of the heat from the room.

On steamer walls, which are of steel, we have seen paint used in which a lot of cork was ground. This left a rough surface, and the manufacturer claimed it stopped the moisture. We have frequently seen the sides damp, however. We had a lot of trouble with a long skylight 12 feet wide this past winter owing to the drip holes freezing up and then condensation would overflow from the gutters and drop on the maple floor.

Another way the enquirer might prevent this condensation would be to install heating coils between the ceiling and the roof. We would advise that a coil be put in one section to see if this prevented the moisture. They no doubt have some ventilators and there would be a current of air upward. The coil should be installed near the eaves.

Their trouble is a hard problem and the above are only ideas which may help, but we cannot say they will cure their trouble.

Logwood Black on Jute Yarn

Kindly give us a good formula for dyeing logwood black on jute yarn. (3137)

The following recipe may serve the purpose of this enquirer. For 100 lbs. of jute yarn:

Prepare a dyebath by dissolving 20 to 25 lbs. of good quality of extract of logwood, or its equivalent of refined logwood product. Then add 4 lbs. of blue vitriol, previously dissolved in a few gallons of boiling water. Then add to the dyebath a solution of 4 lbs. soda ash. Stir well, and allow to cool to about 180° F., when the jute yarn is entered. Turn four times and after about half an hour allow to lie in a heap for a few hours or even over night. Then wash thoroughly.

There are various recipes for jute yarn requiring the use of logwood, but they are all about the same, except that the proportions are somewhat different. This comes about from the fact that there are several qualities of jute, and slight variations in the dyeing formula are necessary to secure uniform results.

Streaks in Dyed Tan Hosiery

We are having trouble with streaks in dyeing heavy shades of tan in ladies' hose. We dyed 100 pounds to the batch and had more or less trouble with streaks, and we cut the dyeing down to 50 pounds to the batch, and still we are having trouble with streaks. We find this mostly in the mercerized goods. We would like to know, if possible, how to avoid the streaks. (3169)

From the inquirer's question we take it that he refers to either mercerized or cotton hose. Streaks in dyeing cotton or mercerized hose are caused in various ways; the most prominent being as follows: not sufficient circulation of the goods through the dye liquor; putting goods into the dyebath near the boil, especially when having salt in the bath; not dissolving the dyestuff properly; not scouring goods with care, and uneven mercerized yarn.

The last cause can be checked up very easily by dyeing different skeins from the cones of yarn and comparing shades and levelness of dyeing. In dyeing heavy tan shades the dyestuff used usually contains at least three different colors which must be dissolved carefully and then strained through a piece of cloth. Do not enter the goods higher than 150° F. and bring to a boil gradually. A little soluble oil, not more than $\frac{1}{2}$ per cent., aids even dyeings, especially when dyeing in a machine.

Uneven Dyeing of Knitted Cotton Glove Cloth

We are troubled in the dyeing of pieces of glove cloth (cotton) with the color not going on evenly and we are wondering if it is due to the fact that the caustic soda is not entirely cleared out. Our process is as follows: Shrink cloth, 32° caustic bath. Rinse 2 hours in water at 130°, slightly acid with sulphuric. We use very little acid in order not to harden the cloth. The color goes on without using salt or boiling, but at times is very uneven. (3182)

Without seeing a sample of the goods described we are inclined to the belief that the trouble of uneven dyeing is due directly to the presence of traces of acid remaining in the cloth after the caustic soda treatment. Since the color is dyed neutral, and without even boiling, we think that the conditions of dyeing are not as perfect as they should be.

We suggest that after shrinking the cloth by whatever process is known to give the best result for the quality of

cloth treated, to wash well afterwards. and then to pass the cloth through a warm or nearly hot bath (150° F.) containing about one pound of some good quality of soluble oil, and keep the goods in this solution for about half an hour. The goods should be kept in slow motion during the immersion. From this bath the cloth may be washed or rinsed in lukewarm water and then dyed. This treatment not only will remove the soda from the cloth, but will prepare the goods so thoroughly that the color will go on the fiber at an even rate, and thus obviating the possibility of streaks. On the other hand, it should be remembered that it may be the trouble of the dye itself.

It may be that the dyes used by this correspondent are mixtures, and that the mixture is not the best one for the purpose. This should be looked into at once. We think, however, that the preparation of the goods as suggested will clear up the trouble. If the dyes used are of the direct dyeing group, try the addition of a small amount of soap and phosphate of soda to the dye bath, and the dye at about 150° F. This will not cause any harshness in the cloth.

Spots on Finished Knitted Cotton Glove Fabric

We are attaching herewith a small sample of the cloth which we make to be used in the manufacture of our gloves. We have recently been having considerable trouble in finishing this cloth, particularly in the shade grey. There has been evidence of light spots in the cloth which have caused us considerable loss in yardage. We are advised by our finishing plant that these spots are caused by the presence of oil in the fabric. This oil is present in the small sample.

The cloth is made on a Tricot machine and the nature of the machinery is such that it is impossible to prevent the oil from dropping on the fabric from time to time. We use for lubricating purposes the very highest grade lard oil that we can secure, and our own chemist, who has made an analysis of it, advises us that it should be soluble in caustic. The finishing plant, however, claims that in preparing the cloth for dyeing the oil acts as a resist to the caustic, and that it is not entirely eliminated, with the result that the dye does not set evenly throughout the piece. In preparing the cloth for the dye it is treated with caustic and shrunk fully 50 per cent., after which it is bleached. It is our contention that the caustic bath should remove all traces of the lard oil and we would appreciate it greatly if you would let us have your opinion on this subject.

(3395)

This problem is very simple. If the lard oil is absolutely pure it will be entirely changed to soap in the caustic boil and there will be no such trouble as described. If, therefore, the lard oil has been adulterated with mineral oil it may be that a sufficient amount still remains in the goods to cause the troubles described. We would suggest having the lard oil analyzed by an independent chemist, asking him to report upon the amount of unsaponifiable matter.

A chemist to whom the sample of cloth was sent replies as follows: With only the very small clipping to be guided by, we are inclined to agree with your finishing plant that the oil causing the spot complained of is some nonsaponifiable oil. If the oil in the spots is pure lard oil, the caustic treatment would at once convert it into a soluble form, whence it would be readily removed. From the fact that the spots do not vanish after the strong alkaline treatment, the presumption is that the oil is of mineral origin, and the odor of it on the small clipping confirms this belief. Your contention that caustic should remove all traces of lard oil is correct. It is the presence of mineral oil that acts as a resist, and which is not removable by the usual means adopted for fatty oils.

Average Counts of Yarn in North and South

Recently published cotton statistics inform us that the consumption of domestic and foreign cotton in the United States during seven months ending February 28 of this year amounted to 3,829,031 bales. Of this, 2,182,911 bales have been consumed in the cotton growing states and 1,646,120 bales in all other states. The active spindles during February numbered 14,312,364 in the cotton growing states and 19,302,746 in all other states. I shall be obliged if you can inform me what are the average yarn counts spun in the cotton growing states and what in the Northern states. I would also like to know about how many cards per 1,000 spindles are required in the South and in the North based on these average counts.

(3201)

There does not appear to be any definite data published or obtainable on which an accurate reply to this query can be based. Calculation based on the figures supplied can be only hypothetical. Two factors are stated—bales and spindles—and, while the former may be accepted as a basis, the latter is subject to modification. How many spindles have worked the full possible time? What are the respective working hours in each district? In other words, what are the spindle-hours?

Further, the limitations of spindle-hours toward accuracy lie in the fact that the spindles are operated at different speeds and on different grades of yarn. An estimate can only be formed by assuming or basing on practical experience the lacking or doubtful factors of the proposition.

Referring to the accompanying table, we commence with the basic factor of cotton consumed in 500-pound bales. The weight of tares must be deducted and this will be based on a 5 per cent. deduction. On the question of waste made in process of spinning an assumption of 10 per cent. loss on the available cotton may be considered to fairly meet the circumstances, for the following reasons: Five per cent. of the rejects, consisting of picker motes and card screenings, cannot be used again in the spinning process. Five per cent. will represent the percentage of card, comber and roving wastes unsuitable for respinning, although most of this material will be used again in spinning.

	Cotton growing States.	All other States.
Consumption in 500-pound bales.....	2,182,911	1,646,120
Tares 5 per cent.....	109,150	82,300
	2,073,761	1,563,820
Waste 10 per cent.....	207,386	156,382
Yarn produced on a basis of 500-pound bales	1,866,375	1,407,438
Spindles active	14,312,000	19,302,746
Bales per spindle in seven months.....	0.13	0.073
Pounds per spindle in seven months...	61.75	34.67
Pounds per spindle per week.....	2.06	1.15
Average counts	22s	30s

It is fair to assume that the spindle figures given as active during February are representative of the seven months, and, in view of the shortage of cotton transportation during that month, may easily be a minimum proportion of spindles active during the seven-months period. The total number of spindles in the United States in August, 1917, are returned as 34,221,252, and active at that date 33,888,835. Accepting the figures of your query, one arrives at the consumption of cotton in bales and pounds per spindle.

The period of seven months covered in your query includes thirty-one weeks, and from this it will be reasonable to deduct

one week for stoppage for heatless Mondays and legal holidays, leaving a working factor of thirty weeks and enabling us to arrive at a weekly consumption of cotton or production of yarn per spindle per week.

From this point the position becomes increasingly hypothetical. In the cotton-growing states the hours of labor per week average sixty and in other states fifty-four, but in addition some extra time has been worked. It is difficult, and perhaps impossible, to obtain these details, but as not all the spindles produce during all the hours worked the normal weekly hours will be adopted. This is not to say that increased hours do not increase production, but that the actual productive hours will be about equal to the full working hours per week.

Quite independent of loss of production due to breakage of ends, doffing and cleaning time, the twist in the yarn and spindle speed will vary the normal weight produced per spindle. Calculating from the revolutions of the front roller, and allowing 10 per cent. for stoppage, and averaging a twist constant of 4, an estimate of the counts produced is obtained.

Basing the requirements in the North and the South on these estimated counts, I should say that 1.5 cards in the North and 2.25 cards in the South will be the proportion.

Soap-Shrunk Finish

We are enclosing a small sample cut from a piece of goods, which is trademarked by the B.D.A. of England, showing that the piece has a soap shrunk finish. Kindly inform us if you have any information in regard to this particular character of finish. (3188)

Worsted serges and dress goods are said to be soap shrunk when they are scoured and milled up to the last in soap solutions. The goods are milled one inch narrower than they are intended to finish and this inch is pulled out again in tentering.

The finish is a favorite one in the English market for dyed and mixture worsted dress serges and fancies. It is seen at its best upon cloths of finer quality than the sample. The characteristic of goods so marked is softness and fullness of handle combined with brightness of appearance. The cloths are warranted not to shrink and it is conceivable that they are not all treated in one way. Goods wetted out in a weak soap solution, without being subsequently tented and then pressed, would literally be "soap shrunk."

Background for Inspection of White Cloth

Please inform me what is considered the best color for a background over which to pass finished white cotton cloth, such as voiles, lawns, dimities, etc., for the inspection of the cloth for damages, oil spots, grease stains, and defects in general. (3216)

There are two ways in which cloth may be inspected: (a) the cloth traveling, (b) the cloth at rest. The conditions affect the reply in some degree. When cloth is looked over after being folded the laps form their own background. It is, however, assumed that the question implies the travel of the cloth over an inclined table and that the questioner wants to know what color the table had better be. The common practice seems to be to leave the coloring of the table to nature, and the result is to provide a brownish background. It is apparent that as between the several cloths named conditions are not equal. Voiles have interstices, making them transparent. Lawns may be thin enough to be translucent and allow the color of the table to be more or less perceptible through the goods. Dimities are or may be opaque. It is expressly desired to render visible defects which are white (e. g., ends of yarns upon the face) and also defects (oil stains and grease spots) which are darker than the fabric. In the circumstances the objects are not perfectly compatible.

The general effect of using a black background is to emphasize the whiteness of the white object placed upon it, but in this respect something depends on the relative sizes of the objects concerned. In the case of a white opaque fabric the material factors are the relation of the width of the cloth to the width of the table. The background frames two sides, as it were, of a picture and the position of the observer, which in some circumstances would also affect the case, may be taken as fixed. The idea being to concentrate attention upon the picture, and not upon the frame, it cannot be desirable to make the latter too conspicuous. Thus the use of a dingy, neutral brown, like that of common wood, would seem to justify itself, as the contrast is sufficient to mark off the boundaries of the object supervised without accentuating the contrast to the point of fatigue. If the cloth is to be watched hour after hour, the question is as much one of the endurance of the individual as of theoretical perfection.

When the fabric is not opaque the color of the background modifies the virtual color of the object to an extent dependent both upon the rate of travel and the color of the background.

Seen at rest upon a black background a voile is a white network, but in traveling the impression of whiteness merges into that of blackness, and the image is a gray, not very trying to the eyes, but not directly favorable to the detection of grayish stains. To make stains as conspicuous as possible, it would be desirable to have a background of white, but in that case holes and weaving faults must be more difficult to see, and they are possibly the most important blemishes of any. To detect imperfections of weave a black or dark ground is manifestly preferable to a white or light one.

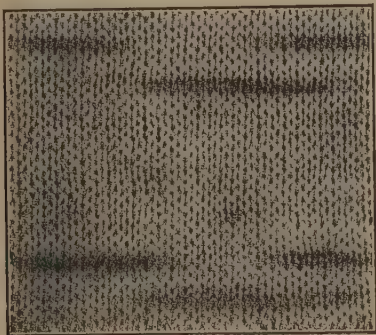
Fatigue of the eye arises more from staring at the object rather than at the incidental background, and consequently the nature of the surface of the fabric is of most influence. Otherwise it might be of greater importance to point out that the matter is not solely one of color. A polished surface, reflecting light in a mirror-like manner, is clearly a more tiresome one than a dull surface. Thus it seems generally desirable to have a dull as well as a dark-surfaced table, although in practice the polish on the table must have a minimum of importance as compared with that upon the cloth.

The superintendent of finishing in a large plant replies as follows: The best and most serviceable background for inspecting white cotton goods I have found to be a black surface set at an angle with a covering of one-quarter inch plate glass over the black cloth. I had some difficulty in determining which was the best, and as an experiment had three tables in front of the machine covered with different shades. Under one I had green, under another red and under another black. Some of the inspectors, who were young women, preferred one color and some another; so I changed them from one table to another and I obtained the best results with the black background.

We had some very heavy bedspreads in fancy weaves, and with these I had one corner of the clothroom arranged with rollers in front of a large window with a good light. I had these pulled over the rollers, with a young man standing behind the cloth inspecting it as it passed slowly over the rollers. Having the tables covered with glass causes the cloth to slide easily. With light cloths, such as lawns and voiles, it is necessary to have the surface of the inspecting board as smooth as possible. With the black background the imperfections in weaving will show up very clearly, and even when there is an end out it shows up very plainly. Stains and spots also show up clearly.

Oily Yarn Streaks in Knitted Web

We again ask your advice in the matter of bleaching. Kindly examine small piece of web which we are forwarding you and you will notice that there are dark streaks in same. We might say that this yarn is of a good quality of wool, and was scoured, peroxide and sulphur bleached, knit on a jersey machine, and was steamed in the roll in a steam box, to avoid curling. And the peculiar part is that the web was perfectly white and clean looking before it was steamed.



STREAKS FROM OIL-STAINED WORSTED YARN

After steaming we found these dark streaks all through it. We thought at first that these dark marks would scour out, but find that this is not the case. We would be very much obliged to get any information that you could give us as to the cause of this trouble. We might say that we thought at first perhaps the yarn was not scoured properly, and then on account of being bleached, that the steaming had an action on the web that took out the bleach in spots, but we really do not know for sure what is the cause of the trouble

(3181)

These spots are due to oil. From their form, we are inclined to regard them as having been on the yarn before knitting. They could not have been formed on the web and at the same time show up as short streaks following one thread. If spots were caused on the web, they would have the general appearance of being more or less round.

Many oil spots do not show distinctly upon woolen yarn, but when the yarn is subjected to the action of steam, the oil works its way into the fiber substance, and imparts to the latter a translucent, or semi-transparent aspect, which is the case in the present instance. The oil passed along quite unobserved until the web came from the steaming operation, and then was distinct.

To remove these stains is a matter of some difficulty. We have tried several methods of scouring, and believe that with the aid of a small amount of ammonia to the scour, the streaks can be almost eliminated. For every 100 gallons of water, use about 1 gallon of ammonia water. If carbonate of ammonia is to be had, use about $2\frac{1}{2}$ pounds for the same volume of water. A soap lather will be necessary to start the oil. Keep the temperature down to 125° F., and finally rinse in clean water.

Hardening of Paste

We use a paste made from sago flour, but it gelatinizes on cooling and becomes too hard to spread uniformly. Can you suggest some formula that will prevent this, so that it will remain soft and smooth when cold? (3212)

I have found the following recipe to give good results in sizing:

1 gal. water
8 ozs. sago flour
 $\frac{1}{2}$ oz. alum

Mix well and boil 5 minutes. Wheat flour can be used in place of sago flour with equally good results.

Sizing Black Goods

We size black goods such as sateens, muslins, etc., with starch and dextrine, but the sized goods come up grayish looking because of the light color of the size. Please inform us if it is customary for finishers to add some coloring to their size in order to make the goods come up black. The sample enclosed shows goods partly treated with sizing and the balance untreated. The sized part looks grayish and is not near as good a black as the original. (3204)

It is customary for finishers to add a black coloring matter, such as logwood, to the size, because no matter how transparent the starch is, the lighter starch body falling on the black will always show a grayish top.

Scouring Half-Wool Hosiery

Please give us a method for scouring half wool plated hosiery previous to dyeing. We have no scouring machine and have been in the habit of wetting out the goods for half an hour in a weak ammonia bath at 160° F., then rinsing. As the black is not so fast to washing as it should be, we thought that perhaps our method of scouring might be at fault. (3195)

It is our opinion that the scouring solution is too hot at 160° F. Good results can be obtained on plated hosiery by scouring in a dolly or laundry machine. We will suppose there are 100 pounds of goods to be scoured. For that amount use one-quarter of a pailful of soda to one pailful of soap. Scour fifteen minutes at 120° F. In the event of your not having either of these machines, we would recommend soaking the goods in a bath at 140° F. in the above solution, rinsing well in hot water.

Removing Grease and Dirt from Finished Woolens

We would appreciate your advising us fully as to the best method to pursue in cleansing fabrics, or refinishing them, after the fabrics in question have had the grease and oil set in them by using cold water and an insufficient quantity of soap in the original finishing. We did not discover that the fabrics had not been finished properly until after they had laid in stock for a short while and we noticed they began to smell and had a very greasy feel. The fabrics in question are of cotton warp, low grade shoddy filling construction, and do not require milling. You, no doubt, appreciate the fact that the grease and dirt is very hard to start after it has been once set in the fabrics with cold water and where an insufficient supply of soap was used. Is there any chemical treatment that we could give these goods without injuring the cotton decorating yarn or the appearance of the fabric in any way? (3398)

The grease and dirt in these goods may be started by cautiously increasing the temperature of a scouring bath containing some soap together with a small quantity of kerosene oil. The amount of soap required for the purpose will depend upon the possible amount of grease in the goods, but there must be sufficient to form an emulsion with the kerosene. The addition of a small amount of sal soda will also add to the efficiency of the scour. After the grease has been started, the

goods are run for a sufficient time to insure the complete loosening of the dirt, and then they are rinsed thoroughly in plenty of water, which should not be too cold.

A finisher replies to this question as follows: The problem is a hard one, but probably it can be solved by the following treatment: Run the pieces for 20 minutes in an alkaline bath of a strength of $2\frac{1}{2}^{\circ}$ Tw. at a temperature of about 90° F. Then add enough of a good soap to the bath to create a lively lather and run pieces for 15 minutes more. Dissolve the alkali in a barrel and apply about 50 gallons to 8 pieces of cloth.

Removing Gloss from Union Goods

Enclosed you will find a small sample of cloth. On one side of this cloth you will note it has a very glossy surface, which is caused by running over the brass plate where the cloth leads into the press rollers (Gessner rotary steam press). The upper side of the cloth is all right, as it does not come in contact with the brass plate. Will you please tell me how to remedy this glossy surface? (3228)

The glossy surface is the natural effect of the cloth coming in contact with the cylinder bed of the rotary press, and of course it cannot be avoided. In cases where the fabric is largely composed of wool, the gloss does not show up so plainly, but this fabric is largely composed of cotton, hence the bare and shiny appearance. It can be improved by running the piece of goods through the steam brush, but this might make the feel too soft or mushy. The effect is not harmful, as it is expected to be removed before the material is made into garments. An experienced buyer will know all about it.

An old finisher replies to this question as follows: The gloss on the sample is produced by the "ironing effect" of the cloth moving on the surface of the stationary jacket of the press bed. The opposite side of the cloth moves along with the surface of the cylinder, getting the pressure, but no drag or slipping effect to produce the gloss. The gloss is intensified by the hardness of the plain weave and the lack of felt. There is nothing that can be done in pressing with this style of press to avoid the trouble. The only remedy is to remove the gloss by steaming after pressing.

Some presses have a steaming attachment at the back to steam the cloth while passing from the machine, which may

be used for heavy goods, but with the slow movement of the cloth the pressure would be destroyed on goods as light as this sample.

The only remedy to suggest is to run the goods over a brushing machine having a steam attachment. Let the cloth come in contact with only one brush, and that only sufficient to remove any substance that may get on during the operation. Have the steamer well covered with cloth, so as to subdue the force of the steam and avoid its going through the cloth to remove the pressure. Steam as lightly as possible to obtain the result desired.

The only objection to this process may be that the cloth is too light; but it may be worth while to try it.

Cloth Shaded in the Filling

Will you give us your opinion upon a matter which is causing considerable trouble in our mill at the present time? We are manufacturing a line of men's suitings, made with black cotton warp and wool filling in gray and fancy mixtures. In some styles, finished goods show shady in the filling way. They are also a little uneven in width. The shadiness appears to be worse in the gray fillings. We have tried hard to locate the cause of trouble, and are pretty sure that it is neither by reason of uneven filling, nor uneven weaving, because very few bobbins of imperfect yarn have been found, and the picks per inch are as correct in the shady places of cloth as in the other. Different lots of the same style of yarn are kept strictly separate, and every care is taken against mixing lots in distributing filling to be woven. Weaving is done with three shuttles, working on an equal order of one pick from each. (3239)

A fabric made with a dark colored warp and a light colored filling is always more liable to shadiness than one in which the same colors are in reverse positions. The width is also more likely to be uneven when the warp is all cotton and the filling all wool, than when they are of an equal quality. If the fabric is evenly saturated with soap and water after being entered in the fulling mill, it is significant that the finished cloth is uneven in width as well as shady. This suggests the idea that there may be a connection between the two faults and that they may both arise from the same source, which may be partly or wholly either inefficiency in mixing and picking the raw stock, or delinquency by twisting yarns unequally in the spinning.

But it is possible that at least part of the trouble is caused by improper steaming of filling. This part of the work is more important than it is generally considered to be. Make sure that the stock is properly mixed and oiled in the making up of batches and run it through the mixing picker at least three times. Also have a close watch kept against the twisting gear of the mule being tampered with. Further, insist upon the filling carrier having the yarn covered when in the steaming box, and do not allow him to apply the steam too strongly, nor leave the job until the steaming is finished.

Analysis of Silk Hosiery

A. How, from the appearance of a hose, can I tell if the silk is ingrain, dipped, thread, or pure dyed?

B. How, by looking at the hose, can I tell if an apparently pure silk stocking has any fiber in it? (3232)

A. The question is not clear as the terms "ingrain," "dipped" or "thread" are obscure. We judge that the inquiry is as to whether the material used has been raw (untwisted silk) or thrown (twisted silk), and as to whether the silk has been weighted or pure dye.

Inspection under a magnifying glass will show whether there is twist in the silk or not, though, if the twist is very slight, as is often the case with tram, say $\frac{1}{2}$ to $1\frac{1}{2}$ turns per inch, this would be difficult to observe. Of course, if a thread could be removed, the question could be easily resolved by passing a needle through the thread, and then, if raw silk had been used, the fibers could be separated from end to end uninterruptedly, while if twisted, even slightly, the twist would show up as the needle was pushed along through the thread.

Pure dye silk cannot be told from weighted silk by inspection. If a thread can be secured, the weighting can generally be detected by burning. Pure dye silk crisps up when burned, leaving nothing but a small black coal at the end of the thread. Tin weighted silk does not so crisp up, but leaves a black ash after burning, in the form of the thread, this being the mineral content. If it is black silk, and is weighted with iron, it leaves behind a soft, fluffy white ash, turning to red, and which smoulders for a short time before going out. If weighted with sugar, it leaves a large coal, the sugar boiling up as it were, just as sugar will do when dropped on a hot stove.

B. Artificial silk has a very high, glassy lustre, which helps to distinguish it from natural silk. If natural silk is given a metallic finish (which is given to it by powerful and long continued stretching under conditions of steam and heat, and which greatly increases its lustre) it will look almost as shiny as the artificial silk. Such steam stretching, however, is rarely applied to yarns for the knitting trade, particularly as the treatment seems to have a rather destructive effect upon the strength and wearing qualities of the silk. The fiber of the artificial silk, however, is, roughly speaking, about eight times as heavy as that of the natural silk. Therefore, if the material had the glassy lustre of artificial silk, coupled with a coarse size of filament, it would indicate that artificial silk, often known as "fiber silk" or "wood silk," had been used.

If a thread can be secured from the fabric, however, it can at once be told by burning. The artificial silk, being made from a vegetable fiber base, when recreated as artificial silk is still a vegetable fiber, and will therefore burn quietly and quickly with a clear flame just as cotton yarn will, whereas animal fibers, of which silk is one, will, if unadulterated, always crisp up and go out, and, if adulterated, will act as explained in the answer to the preceding question.

Dyeing Merino and Cashmere Half Hose

We would like to inquire of your question department if there is any advantage in dyeing this class of hosiery on the face side. By so doing it saves one turning operation and so far as we can see it makes no difference in the appearance of our merchandise, but we should like the opinion of an expert on this matter before going into it more fully. (3225)

A hosiery dyer of large experience replies to this question as follows: In previous years many mills dyed their merino and cashmere half hose, as well as their silk and fine lisle hose, on the backside, as they assumed that this would free the face side of fuzzy matted surfaces, pulled threads, etc. Most of the hose were then dyed in open kettles or tubs, where poling of the goods was the means of circulation. If the poles were not kept in good condition they would cause damage to the goods, and furthermore bad poling would mean that the goods would become tangled and knotted so badly as to injure the appearance of the hose.

Merino and cashmere half hose can be dyed on the face side, giving the same appearance as if dyed on the back, if care

and perfect manipulation in handling the goods are given. A good, clean scour is very essential. Excessive boiling tends to mat the fibers, and this can be avoided by gradually bringing to a boil and then dyeing just below the boiling point.

In my experience, I have dyed this grade of hose in the open tub and in machines on the face side, and most all the goods were in perfect shape as to shade as well as appearance. In rinsing this grade of goods from the dye bath, it is best to use warm rinse waters instead of cold. If your goods become matted too badly, you can full them in a rotary washer. Make sure you have your dye bath long enough to circulate your goods in, which if dyed in an open tub require from 40 to 60 times as much water as the weight of the goods to be dyed.

Material for Bleaching Tanks

What lumber is considered the best for wooden tanks in which material is to be treated with a weak solution of chloride of lime and after that neutralized with a weak acid solution? I am using at present cypress tanks, but I find that the bleach is eating through the edges between the bottom and staves. The tanks have been put up in the proper way, and did not show any leaks for the first four or five months. Is there any compound on the market which could be used for stopping up the leaks and is not affected by water or acid? (3240)

Probably the best wood to use in constructing tanks or vats for bleach liquor is pine. The joints should be heavily leaded with white or red lead or with hot asphalt when first put together. The action of chlorine on linseed oil is peculiar and this oil has been used to very great advantage in treating wood for such tanks by applying it hot when the wood is quite dry. The great trouble in applying any impervious coating is that the wood is generally treated while damp or green, in which condition the coating does not adhere perfectly. A hot application of a good asphalt paint protects the wood against the action of the bleach liquor without discoloring it.

The use of thick white or red lead in the joints not only serves to make a superior joint, but if leakage occurs, the chlorine liquor converts the lead to a chloride which is normally insoluble. Lead lined tanks can be used, but the expense of constructing them of sufficient size is not balanced by the advantage over wooden tanks. For the purpose indicated, it would appear that a wooden tank, well jointed, and given a

light protecting inside coat of asphalt, should meet every requirement. Very durable bleaching and dye tubs are now constructed of stoneware slabs, and also from a kind of hard soapstone that is much employed in making stationary domestic laundry tubs. This matter might be well worth investigating.

A bleacher replies to this question as follows: I was having the same difficulty that the enquirer is experiencing. I was employed in a small lace mill to do their bleaching and found that they had pine tanks in which to do the bleaching and scouring. I informed the owners that the chloride of lime would eat out the tanks in a short time. They did not want to go to the expense of lining them. They worked well for a time, but in about six weeks the lime had eaten through the edges between the bottom and sides. At this time we had a man putting in a cement floor in the bleach house and the thought came to me to line the tanks with cement. I had the man nail half-inch strips of wood two feet apart along the bottom and sides inside a tank. Then he put on laths about half an inch apart, and plastered the tank with one part Portland cement and four parts sand. After this had hardened we washed it well and it gave good results. Since that time I have had quite a number of tanks lined in the same way. One knit goods mill I worked in was having trouble with stains caused by the goods rubbing on the lead lining in the bleaching tanks. I had the lead taken out and cement put in and the stains disappeared.

De-Rubberizing Fabric

I enclose a sample of rubberized cotton goods. Kindly advise what can be done with this cloth to make it pure from rubber. We bleach it, but after it has been dyed it leaves a mark as in the dyed sample enclosed. (3198)

The proper way to handle these goods is to de-rubberize the fabric by means of some solvent suitable for rubber. This means that the process should be carried out in a digester in which the goods are placed, and through which the solvent is made to circulate. There are several solvents that dissolve rubber, but for goods like the sample submitted it would seem that one of the cheaper kinds will suffice. The Barrett Company, New York, are producers of rubber solvents, derivatives of coal tar related to benzol, and it might be an advantage to get in touch with that concern and see what they have to offer for the purpose.

Bleaching Towels with Colored Stripe

What is the proper way to bleach towels that have a colored red and blue stripe woven in near the selvage? Can they be bleached with caustic soda and under pressure? Can they also be bleached with soda ash and soap; if so, what per cent.?

(3208)

It is assumed that the stripes in the toweling are dyed with colors that will resist the action of chlorine. It is not necessary that the work be done under pressure, provided the kier is so constructed that good circulation of the liquors is assured.

First give the toweling a boil for about six hours in a solution of caustic soda containing two to four pounds of caustic for every 100 pounds of goods, keeping the cover on to protect the kier contents from the action of the air. After boiling run the soda liquor off and wash well with plenty of water. In the meantime prepare a solution of soda ash with two to three pounds of ash for each 100 pounds of goods, and boil in this solution for about four hours longer; run off and wash again well with water. Different kinds of cotton may require a longer or shorter time in the soda boils, and this point should be given attention in making the first trials. It is unnecessary to boil longer than to make sure that dressing and other impurities in the goods are completely removed to properly prepare the toweling for the subsequent bleach. If the cotton is not quite free from oils, fats, waxes and the dressing, there is every probability that the final bleach will not be in all respects satisfactory.

After the washing from the soda boils, the goods are covered with a bleaching solution of chlorine, standing at from one-half to one degree Twaddell, which is sufficiently strong to effect a good, clear bleach without affecting the strength of the fabric. The duration of immersion in the bleach bath should be about four hours, but it might become necessary to extend the time to six hours. A few trial lots will show the exact time required to give a good bleach. After bleaching the goods are again washed well and given a "sour" in a bath of weak sulphuric acid, standing at one degree Twaddell, and even this strength may be reduced somewhat, say to three-quarters degree Twaddell. Finally wash well with two changes of water and blue the goods in the last wash.

Once in a while, however, due to imperfect dyeing of the red stripe, there is a tendency for the color to bleed slightly,

a defect that is very difficult to overcome, but the writer knew of an instance of this kind where the bleacher resorted to the expedient of alternating the procedure as outlined above, and after the soda boils passed the goods through the acid before putting into the chlorine. The goods were washed between the two treatments. After coming out of the chlorine they were washed and given the "sour" in the usual manner to "kill" the last traces of bleach liquor.

Referring to the last part of this inquiry, soap and soda will not bleach.

Carding Hair

We would like you to give us an answer to the following question on carding hair. The cylinder is running point first toward the balling head. Should the worker and stripper revolve point first? We desire this information on a single worsted card having four workers and four strippers. We are now running the cylinder point first toward the balling head; the workers point first to the cylinder points; the stripper wire, heel to the worker points. (3220)

In reply to the inquiry regarding the running of the workers and strippers to the cylinder, we would say that the cylinder should run point first to the balling head, the workers heel to the cylinder and the strippers point to the cylinder as well as to the worker. Care must be taken in running the cards on this kind of work. It will pay to run them slowly and keep them in good condition all the time.

Preventing Shrinking in Wool Hosiery

We make a line of men's half hose and women's stockings from all-wool Botany yarn spun on the French system. These are fine hose, and the only complaint that we receive of them is that they shrink too much in washing. Can you inform us of any process that would help to prevent so much shrinking? (3229)

These articles should be washed in lukewarm water, and not handled very much during the washing. Soft water only should be used, as this requires very little soap to produce a suds. Too much soap is injurious, since it leads to felting, which is the direct cause of the shrinking. Do not dry rapidly, that is, do not use excessive heat for drying. It was formerly the custom for those who wore all-wool stockings to make use of drying boards to fit, and which was for the purpose of keeping the feet stretched to their proper size during drying.

Formula for Peanut Oil Emulsion

We are trying out peanut oil as a substitute for olive oil for use on our stock, but so far have been unable to get a stable emulsion from it. Can you give us a formula for a good emulsion for use before combing and for conditioning yarn?
(3246)

While peanut oil and olive oil are very much alike, yet up to the present, peanut oil has not been used on any large scale for the purpose you name. There are several peanut oils on the market—Oriental, domestic crude and domestic refined. Essentially the same, they will differ in the amount of free fatty acid they contain. Emulsification depends largely upon the ease with which the fatty acid of an oil can be converted into a soap by the use of an alkali. Borax is usually used for this purpose, sometimes associated with a little ammonia or a small quantity of caustic soda. Do not try to make an emulsion with very hot water, above all things, never boil an emulsion. A temperature around 140° F. is about right.

An oil chemist to whom we referred this inquiry says that to get a stable emulsion of the peanut oil, from two to three per cent. of red oil, either distilled or saponified, should be added and then an amount of caustic soda, not to exceed 1/10 of 1 per cent. of the red oil used. Hot water may then be added.

It will probably be necessary for you to do a little experimenting. Do not make your emulsion too weak, and as a general principle, the more free fatty acid an oil contains the larger will be the proportion of alkali necessary to convert it into an emulsion.

Cleaning Lint from Knitting Machine Stop Motions

Will you please advise us if you know of any way that lint and dust can be kept from the stop motions of knitting machines, as we seem to have quite a little difficulty in this respect? Possibly some sort of vacuum might be used. (3235)

A knitting mill superintendent replies as follows: Many mills, including the writer's, have installed blowing-off systems. I use a hose for every six frames and blow them off every half hour. I find it saves holes, bunches and dirty lint from running into the goods. An air pump, one or two reservoir tanks, and a half inch feed pipe are about the only expense, and the arrangement is well worth the money.

Oil for Shoddy Manufacturing

Will you kindly advise us of an oil to use on woolen rags before picking in the manufacture of woolen shoddy, also the amount usually applied and the best method of application.
(3231)

Saponified wool oil is a good oil for woolen rags. An oil with not less than 10 per cent. of fat in the mixture should be used. The more fat, the better for the stock, for it will penetrate the rag better and the better the staple will be when picked and carded. Usually 14 per cent. of oil is used on woolen rags.

Where the mill is carding the stock and has trouble in opening the threads, an emulsion is used to help open up the fibers. The emulsion is generally made with equal amounts of oil and water. The water is heated to the boiling point and either borax or soda ash dissolved in it before adding the oil. About one pint of borax or soda ash is enough for one barrel of emulsion. Care should be taken to have the water boiling hot and not to get too much borax in the water. Twice as much emulsion as straight oil is used on a batch of stock.

To apply oil to rags, the material should be spread out thin and a sprinkling can is commonly used to distribute the oil. The rags should be left to soak over night at least; forty-eight hours is better; and on very hard worsted stocks, three days is none too long and makes the material pick easier and card better. The writer always has his oil boiling hot when applying on rags, whether using emulsion or straight oil.

Fireproofing Raw Cotton

Please advise us if you know whether raw unspun cotton can be treated with a solution to make it fire-resisting. To what extent would this treatment make cotton fireproof? What is the cost of the process per pound of cotton? Would it discolor the cotton and to what extent? Would the cotton thus treated lose any of its spinning qualities or tensile strength?
(3351)

The fireproofing of textiles has been investigated by many chemists and a number of processes have been suggested aiming to make fabrics non-inflammable or as nearly so as possible. Most of the compositions, however, do not permanently fireproof the fabrics to which they are applied, for the reason that upon once washing the goods the fireproof constituents

are removed. Belonging to this class of substances may be included the following chemicals:

Sulphate of ammonia.

Sal ammoniac (muriate of ammonia).

Borax.

Ammonium phosphate.

Ammonium carbonate.

Tungstate of soda.

Alum.

These are all water soluble. Applying any one of them to raw cotton for the purpose of fireproofing is a doubtful procedure, as the dried salts would cause considerable trouble during the subsequent manufacturing operations.

Permanent fireproofing of textiles is to be regarded as a recent achievement of chemists, but owing to the nature of the reaction that takes place, only piece goods are regarded as being susceptible of treatment. The process in question is patented and consists of treating the material to be proofed with stannate of soda, afterwards fixing stannic oxide on the fiber by treating the goods with a solution of sulphate of soda. The success of the process depends upon the completeness of the drying of the goods after having been saturated with the chemicals. In view of this treatment, it seems doubtful if this particular process is available for fireproofing raw cotton, for the reason that the spinning qualities of the cotton would be very materially impaired.

Introducing a New Fiber

I am trying to get a fiber on the market that has some advantages over cotton, flax and ramie. It requires peculiar treatment in preparation for spinning and weaving and probably peculiar machines for working it up. I would like to get in touch with parties producing suitable appliances and also would like to know how to put the fiber on the market. I have perfected a process for degumming and bleaching the fiber and if I can find the right class of machinery, the material should find a large use and we might build a factory here. I might say that my process is electrical. (3242)

At the risk of discouraging initiative we must inform the inquirer that there are numbers of "new" fibers brought to the attention of the textile trade every year, so that naturally mills are skeptical of anything that is claimed to be better than cot-

ton, flax or any of the staple fibers. This does not necessarily mean that the fiber might not prove valuable, but it will explain why the trade is never enthusiastic about new discoveries in textile fibers. Any new fiber would have to be produced in large quantities in order to be useful and hundreds of pounds of the fiber would be required for a practical try-out. This try-out would cost considerable as it would mean the stopping of regular work on a set of machinery to put the new fiber through, and textile machinery is working at capacity today so that manufacturers are not eager to make experiments. The enquirer might submit samples of the fiber to the leading machine builders whose advertisements will be found in **TEXTILE WORLD JOURNAL**. He might also take up the matter with mills using similar fibers whose names and addresses can be found in the Official American Textile Directory.

Stiffness in Mercerized Yarn

We have a lot of yarn in stock like the enclosed sample which is 40/2 C.P., mercerized, processed in the warp and put up on parallel tubes. This yarn has been in stock since last September, at which time we used the greater part of it but still have remaining several hundred pounds. The character of the yarn has changed during the interval to such an extent that it is impossible for us to work it on account of the stiffness of it. We would like to know the cause of this and also how it can be avoided in the future. Is there any way of softening this yarn in its present form, i. e., on parallel tubes? (3247)

On account of the color of the yarn at the present time, it is not possible to apply the sensitive tests necessary to determine the state of acidity or alkalinity which might have some bearing on the stiff condition now present. Cases like this have been noticed with sulphur blacks, but this does not appear to be a sulphur color. In the absence of any definite tests which will positively identify the cause of the trouble we may assume that the sizing contained too small a quantity of oil or grease to impart flexibility to the yarn and that it was wound in a dry condition. There are machines on the market at the present time which are capable of treating tubes, spools and cones with uniformity and we suggest that the yarn be treated with a solution of a cotton softener or soluble oil, which would result in a great improvement, whatever the cause.

Production Records for Weave Room

We would like suggestions for a suitable form for keeping accurate production records in our weave room. We have a register on each loom and would like to keep a record of each loom and its daily production so that at any time in the future we could refer back and see just what a certain loom made on a certain date. Any information you can give us along this line will be greatly appreciated.

(3414)

WEAVING DEPT. PRODUCTION REPORT.									
SECTION-3									
DATE Sept. 10, 1918									
LOOM No.	WEAVER No.	HRS	STYLE	DAYS READING	PREVIOUS READING	PICK PRODUCTION PER IN.	PICKS	YARDS	NOTES
210	35	9 ³ / ₄	311 ¹ / ₂	56,129	517,217	43,912	42	29	Change warp
211	35	9 ³ / ₄	311 ¹ / ₂	715,003	663,792	51,211	42	34	
212	149	7 ¹ / ₂	311 ¹ / ₂	119,359	88,149	31,210	42	20 ²	Loom Lynella
213	149	7 ¹ / ₂	311 ¹ / ₂	72,857	40,798	32,059	42	21'	
214					311,719				No Weaver
215					109,527				" "
216	113	9 ³ / ₄	314 ¹ / ₂	657,992	636,679	21,313	42	14	Learner
217	113	9 ³ / ₄	314 ¹ / ₂	421,347	412,232	9,115	42	6	"

FIG. 1 DAILY LOOM PRODUCTION REPORT

Production records for keeping permanent data on loom production and attendance is essential, not only for the sake of making comparisons, but also for the purpose of obtaining definite information on costs, attendance, efficiency and ma-

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chinery troubles. The method of recording can be most conveniently obtained through pick counters, although this is not absolutely essential, as in many mills cuts are the unit of production. In the present case it has been assumed that pick counters are used.

SECTION NO. 2... LOOM NO. 15...						
PRODUCTION RECORD OF MONTH SEPT. 1918.						
DATE	WEAVER NO.	HRS.	STYLE	PICKS	YDS.	NOTES
1	7	10	1105	27152	27	
2	7	5	1105	12078	12	
3						
4	7	8	1105	24917	22	
14	7	10	1105	21719	21'	Change Warps
15	7	10	1105	29315	29'	

FIG. 2 FOR MILL WEAVING ONE STYLE example:

The information required on this record is the Section Number, Date, Loom Number, Weaver's Number, Hours, Day's Reading, Previous Reading, Picks Produced, Picks Per Inch, Yards, and miscellaneous remarks for which a column is provided. The length of the record should be sufficient to accommodate the largest section of looms.

Every evening each loomfixer fills out the following data for each loom of his section:

Loom Number
Weaver's Number
Hours
Style
Day's Reading
Picks Per Inch

Information such as "Changing Warps," "Loom Trouble," "No Weaver," "Learner," or any other information of conditions affecting the production.

DATE	WEAVER NO.	HRS.	STYLE	PICKS	YDS.	NOTES
16	7	5	1105	10679	10'	
17						
18	7	10	1105	26317	26'	
19						
29	7	10	1105	22717	22'	Loom Trouble
30	7	5	1105	11566	11'	
31						
STANDARD Hrs		PRODUCTIVE Hrs		YDS. PRODUCTION		% PRODUCTION
235		212		416		91%

FIG. 2A REVERSE SIDE OF FIG. 2

The records are taken to the boss weaver and after inspection sent to the office. The clerk in the office who is entrusted

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with the work of keeping the records looks up the previous readings and enters the figures into the "Previous Reading" column. To prevent waste of time in looking up old readings on looms that are not in operation, the previous readings are carried forward every day, as shown in the illustration at

SECTION No. 3				LOOM No. 210			
PRODUCTION RECORD OF MONTH <u>September 1918</u>							
DATE	WEAVER No.	HRS	PICKS PRODUCTION	CLASS OF GOODS. Yds			NOTES
				311 1/2	311 1/4		
1							Sunday
2							Labour Day
3	210	9 3/4	43911	29			Changeable
4	210	9 3/4	51210	34			
5	210	9 3/4	49015		32 2		
14	210	4 1/2	20045	13'			
15							

FIG. 3 SEVERAL STYLES OF GOODS WOVEN

being the unit of production, this data is determined next. Yard production is equal to:

Pick Production

Pick per inch $\times 36$

The clerk should prepare a table of all filling constructions multiplied by 36, and this work can be reduced to a simple division of the pick production by the coefficient of the construction.

THE MONTHLY LOOM RECORD. The records discussed above afford no immediate comparison of the continuous performance of every loom, therefore a monthly loom

DATE	WEAVER No.	HOURS	PICKS PRODUCTION	CLASS OF GOODS. Yds			NOTES.
				311/2	311/4	615	
16	210	9 3/4	46784			30 2	
17							
28	210	4 1/2	19115			12 2	
29							
30	210	9 3/4	49752			33	
31	210	9 3/4	47332			31'	
	STANDARD HRS	PROD HRS	TOTALS FOR MONTH			GRAND TOTAL	% OF PRODU
	244 3/4	244 3/4	114728	63	241'	537	842' 100%

FIG. 3A REVERSE SIDE OF FIG. 3

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record must be constructed to show at a glance this continuous performance. The construction of this record depends upon the class of goods being made and the conditions under which

PRODUCTION RECORD OF MONTH—November 1918 SECTION 31 LOOM 1137.																
DATE		DAY PRODUCTION					NIGHT PRODUCTION					TOTAL		NOTES		
		WEA- VER	HOURS	PICKS	CLASS OF GOODS.	Yds.	WEA- VER	HOURS	PICKS	CLASS OF GOODS.	Yds.					
					317	1105	1210	1411		317	1105	1210	1411			
1	715	10	54	210		58	211	11	55	132		59 ²		117 ²		
2	715	10	53	913		57								57	no night weaver	
3	715	5	21	534		22 ²								22 ²	no night weaver	
4																
12																
13	315	10	52	715		46 ²	211	11	51	915		45 ²		92		
14	315	10	47	070		41	211	11	50	739		43		84	loom trouble	
15	315	10	52	313		46	211	11	53	615		47 ³		93 ³		

FIG. 4 SEVERAL STYLES WOVEN; LOOMS RUNNING DAY AND NIGHT

the mill is operating. The information required in each case is Date, Weaver's Number, Hours, Style or Class of Goods, Picks, Yards, and miscellaneous notes. Figs. 2 and 2a; 3 and

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3a; and 4 and 4a represent such monthly loom records. They were constructed to cover the requirements of various mills working under the following conditions:

DATE	DAY PRODUCTION						NIGHT PRODUCTION						TOTAL YDS.	NOTES.
	WEA- VER	HRS.	PICKS	CLASS OF GOODS- YDS.			WEA- VER	HRS.	PICKS	CLASS OF GOODS- YDS.				
				317	1105	1210				1411	317	1105		
16	315	10	54310			48 ³	211	11	52456			46 ²		94'
17	315	5	20345			21 ²	211	5	20993			21 ²		43
18														
30	315	10	59715			54 ³								54 ³
31	315	5	23417			20 ³								20 ³
	STAND. HRS.	PROD. HRS.		TOTALS FOR MONTH			STAND. HRS.	PROD. HRS.		TOTALS FOR MONTH				% PRODUCTION
	250	250			167 ²	515 ²	544	275	123		59 ²	311	175	1762'
														100% 45%

FIG. 4A REVERSE SIDE OF FIG. 4

Figs. 2 and 2a for mills making only one style of goods.
 Figs. 3 and 3a for mills making several styles of goods.
 Figs. 4 and 4a for mills making several styles of goods, and running looms day and night.

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In the case of Figs. 4 and 4a it would be a mistake to lump the day and night production together, since comparison of day and night work is not only interesting, but extremely important. These records are most conveniently made in a card file

SECTION No. <u>3</u>			LOOM No. <u>210</u>					
PRODUCTION RECORD FOR THE YEAR 191 <u>8</u>								
MONTH	STAND- ARD HRS	RUN- NING HRS	CLASS OF GOODS YDS				TOTAL YDS	% OF PRO- DUCTION
			311½	311¼	530	615		
JANUARY	235½	197¾	619				619	84
FEBRUARY	215½	215½	602				602	100
MARCH	244¾	235½	675				675	95
APRIL	235½	211	210	436			646	90
MAY	235½	235½		627			627	100
JUNE	244¾	227½			311		311	93
JULY	235½	235			294		294	100
AUGUST	244¾	244¾				675	675	100
SEPTEMBER								
OCTOBER								
NOVEMBER								
DECEMBER								
TOTALS FOR YEAR.								

FIG. 5 YEARLY SUMMARY FOR EACH LOOM

system, printed on both sides, thus saving space and paper. At the bottom of each month's record space is provided for a summary.

These records can be completed with the addition of a yearly summary for each loom, as illustrated at Fig. 5.

Knit Cloth Sticking Together in Fulling

We have been fulling knit goods under what we believe to be our usual conditions, but recently have had several pieces stick together so that we had to pull them apart forcibly. Can you suggest what might be the cause of this? (3257)

This difficulty can be assigned to several causes. If the inquirer is using one of the latest types of fulling mills, I think the trouble is due either to overloading, too long a time in the mill, or too much soap. Then again one batch of stock may be a little different from the rest, and will mat more

readily. Not being familiar with the conditions under which the goods are fulled, it is hard to give the cause and remedy. Some mills use straight stock, others shoddy and their own garnetted stock. Consequently the use of garnetted stock each day from the cutting department changes the batches in the picking room, making it poorer unless a sufficient amount of good stock is added to offset this. When this is done the batch will contain a mixture of long and short fibers which are conducive to matting unless extra precautions are taken. The trouble might arise from the dyeing. To determine this I would suggest fulling a piece of white cloth and then a piece of colored and see if they both act the same.

Reduction of Dyestuffs

We wish to inquire in regard to adding dextrine to basic colors as a means of adulteration. Why is this product preferable to common salt or glauher salt? (3237)

The reduction of dyestuffs by means of inert materials is not only a diminution of strength but there are certain chemical features which must be considered at the same time. Plain salt is generally applicable with direct acid and sulphur dyes. Calcined asurber salt may be used in the same way, but it is quite necessary to first ascertain whether iron is absent, as the presence of iron will have a bad effect on the dyestuff. When we attempt to reduce basic dyes, however, the presence of salts will cause the precipitation of the coloring matter and greatly interfere with the dyeing process. Dextrine being a colloid exerts a very beneficial influence on the dye solution. It causes the basic dye to be taken by the fiber more slowly and evenly. Soluble starch may be used in place of dextrine with equally good results, but ordinarily starch is not suitable on account of the difficulty of dissolving it without boiling.

Automatic Temperature Controllers

The writer in going through cotton plants in the South has been very much surprised at the extent to which they use automatic temperature controllers on their size boxes, and he has also noted quite a few of these instruments on hot water tanks, dye machines, carbonizers, drying machines, etc. I was, therefore, tempted to write and ask if the use of this apparatus is now becoming general throughout the textile industry; if so, it certainly appears to be a step in the right direction. Several of the mill superintendents interviewed in the South

express themselves as more than pleased with the controllers, and state that they have accomplished really wonderful savings in time, steam and labor, besides preventing spoilage. (3338)

In both the cotton and the wool branches there is no greater cause of damage to goods in process than variations in temperature. This fact receives more attention each year and as a logical result the use of temperature controllers increases. In the past year labor and fuel conditions have caused mills to look carefully into means for greater effectiveness, and this has helped to make the use of controllers more general in all processes where temperature is a factor.

Sizing for Sewing Thread

Kindly give me a formula for finishing or dressing sewing thread that will add greatly to the tensile strength without destroying the flexible nature of the yarn. (3252)

It is difficult to give a formula for a dressing for sewing thread, not knowing what kind of finish is desired. Below are two formulas, one for a soft finish and one for a hard, bright finish.

SOFT FINISH

- 1 lb. wheat starch.
- 1 lb. corn starch.
- $\frac{1}{2}$ lb. dextrine.
- 4 ozs. buffalo hide glue.
- 8 to 12 ozs. soap or other softener.
- 4 gals. water.
- Boil for three minutes.

HARD FINISH

- 1 lb. dextrine.
- 1 lb. potato starch.
- 1 lb. American gum.
- 8 ozs. buffalo hide glue.
- 4 ozs. paraffine wax.
- 4 gals. water.

These proportions can be varied to suit various kinds of thread by using more or less water according to the finish desired. In preparing the above, dissolve the wax and glue before putting in the mixture, also be careful to have the starches thoroughly dissolved before boiling. A machine similar to a slasher may be used for applying the sizing, and the

amount of sizing can be regulated by the squeeze rolls, so that the amount of sizing on this machine can be regulated, as well as the mixings. When making the mixings for the sizing, I would advise warming the mixture before adding the wax and glue. If the mixture is cold when the wax and glue are added, it is apt to coagulate.

Tension on the Filling to Prevent Bunches

We are experiencing considerable trouble with the filling in our jute cloth coming out of the shuttle in bunches. Could you give us any assistance as to what may be the source of this trouble? We have tried different constructions of cop, also different tensions in the shuttle, but have been unable to eliminate the bunches. We are mailing you under separate cover two of our cops, also sample of the cloth, showing the way the filling is giving us trouble. (3250)

The bunches in the filling of the piece of cloth made from jute yarn are similar to kinks in woolen mills, where filling is used on the cop. The cop seems to be built all right, and the trouble is no doubt in the weaving. To avoid these kinks, it is necessary to have a very stiff brush in the shuttle. A good brush is made from bristles from an ordinary hand brush, such as is used in the cleaning of machinery. To put this brush in a shuttle, bore a hole about one-half the size of the shuttle eye, and on a line toward the cop, about 1 inch from the eye. This hole should be bored through both sides. Insert the bristles (about the number taken from one hole in a hand brush or all that will fit tightly in the hole) from the inside with a piece of wire and draw out on both sides, letting the ends of bristles from the hole on one side overlap the ends of the bristles from the hole on the other side. The filling will then run through the bristles which will hold any kink that may come from the cop.

Another kink which has been found to work to good advantage is to draw one bristle brush straight through both the holes bored in the shuttle as described above, and run the yard through the tuft of bristles, using a heddle to draw it through. The yarn seems strong enough to stand this method of running. Another good plan is to bore a hole in the back of the shuttle opposite the eye and insert a stiff bristle brush with the end pressing against the eye. This brush can be used in conjunction with the others. It is a good plan to run looms with the least power possible on the picking motion.

Bleaching Mercerized Top Silk Hosiery

We are sending you a sample pair of thread silk boot, mercerized top hosiery. We call your attention to the lisle top not bleaching out evenly with the silk, and you will note that it has a yellow cast. This does not happen in every batch, and we are at a loss to know what causes it. Can you set us right? (3339)

The cotton contains traces of iron, which, of course, will not bleach out as it should. These traces of iron are from the mercerizing process, and if the solutions of the latter process are clean, the iron discoloration of the cotton will not appear.

There is no remedy to apply other than a treatment with dilute acid, which will dissolve the iron, then wash well and proceed with the bleaching in the ordinary manner. The best acid to use is muriatic acid, but it should be very weak, since only a small amount of acid is necessary to effect the removal of the discoloration. The washing after the acid treatment must be thorough, so that no trace of acid remains.

Construction for Dyehouse

We would be pleased to know what experience has proved to be the best method of construction for a one-story dyehouse for cotton piece goods that will most perfectly avoid dripping from condensed steam and vapors. The dyehouse under consideration would be about 65 x 150 feet. (3236)

Condensation has been a frequent source of trouble in dyehouses, and this is more serious where light shades are dyed. The most vapor will come from the boiling-off and starch boxes. More vapor also comes off the dye boxes now, owing to the present dyes which require to be heated to a higher temperature than formerly. If dry cans are in the same room they should be covered with a hood and a duct carried up to an exhaust fan.

For a dyehouse of the size mentioned, there should be eight or ten fans arranged near the machines giving off the most vapor. These fans should be installed up at the eaves and the fans encased in a box with a sliding door. They should have free openings and exits for the air. A suitable size will be about 42 in. in diameter and they should be driven from 700 to 900 revolutions per minute. These fans can be driven by quarter-turn belts from the main shaft.

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If most of the moisture is exhausted by fans, there will not be much chance of bother from condensation. The heating coils should also be installed on the walls and they also circulate the air. The door on the fan box, mentioned above, is used to keep out cold air when the plant is not running, and will be found of advantage in the winter months. This door can be made to slide and is operated from the dyehouse floor with a rope and sheave.

The monitor type of roof, with the monitor running lengthwise, should be suitable for the district mentioned. The roof from the monitor to the eaves should have a slope of 3 in. to the foot.

The writer's advice is to discharge the moisture outdoors. There is another method used which blows heated air into the top of the dyehouse and coils of pipe with cold water circulating through them are also installed. Drip pans are secured under the coils. This method is installed by a prominent firm of ventilating engineers and they have had good success in several installations. The moisture is condensed on the coils and a clear atmosphere is the result. Ventilators should also be installed in the monitor and if a good type is installed, they will also remove considerable vapor.

Twill Weave

Will you kindly advise us if it is possible to make a perfect twill weave with three harnesses? We have heard that this could be done; if it is possible, please advise what shape cams are used and how they should be set. (3253)

The three harness twill is one of the best known of the twill weaves, and it may be woven either 2 up and 1 down, or 1 up and 2 down. We do not know exactly what you refer to by "perfect twill weave"; but if you mean a twill which has the same amount of warp and filling on both back and face, the three harness twill is not a perfect twill weave. The smallest number of harnesses on which such a twill can be made is four harnesses, 2 up and 2 down. In regard to the shape of cams, it would be impossible to go into this subject in the space available. Such cams are supplied by loom builders, and it will serve no useful purpose to attempt to give a description of their construction. The three harness twill, warp flush and filling flush, has been sent the inquirer on design paper.

Testing Cleanliness of Wool Goods

We would like to have you advise us as to any test or tests that we could make on woolens to determine whether or not they were absolutely clean before they left our finishing department, and, of course, right after they were finished. We have had instances where goods would handle and would smell all right right off of the press while hot, but after they laid in stock for a short time, and the unsaponified oil or soap had a chance to age, we would get quite an odor and the goods would discolor trimmings in garments. We understand that there are some simple tests that can be made to determine whether or not the goods are absolutely clean, and if there are we would appreciate your advising us fully as to these various tests. (3442)

Woolen goods have the common fault of containing oily material and fats which have not been removed in process. At the time the goods come from the hot press these cannot be noticed, but later they may become evident and lead to much trouble. As it is not stated in the question whether it is possible to cut the goods or not, two methods of testing will be given which are simple and require but a few minutes to carry out.

UNSAAPONIFIED OILS. A small piece of the goods (10 grams) is taken and placed in a dish. This is then covered with carbon tetrachloride or ethylene dichloride, heated to luke-warm, well squeezed, the cloth removed, and the solvent evaporated by placing in a warm place or over a steam pipe. Any unsaponified matter will remain as a residue. The evaporation is best carried out in a watch glass. If the goods cannot be cut, a corner is immersed in the solvent, well worked with the fingers and then evaporated.

SOAP. Another sample is taken and boiled with water, squeezed, the water poured into a watch glass and a little concentrated hydrochloric acid added, when the free fatty acid will separate out. Goods that cannot be cut are worked as under "unsaponified matter," and then the acid added.

These two tests can be carried out in a shorter time than other methods, it is believed, and are used by several of the large woolen mills as a control on operations and processes.

A superintendent replies to the question as follows: We know of no tests to determine whether woolen goods are thoroughly clean, other than the senses of sight, touch and smell. If there is any soap left in the cloth after washing, it

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will surely be indicated by the smell given out in pressing with the rotary press. The sort of oil used on the raw stock may cause the trouble, and cotton mixed along with wool might also be the source. A good finisher says that there is nothing more likely to bring about the objectionable condition than letting the goods lie in the unfinished state after being washed. We have known of similar trouble being caused by bad smelling cloth boards. The discoloring of trimmings in garments may be owing to other causes, such as excessively hot pressing irons, or crocking of colors not fast dyed, or maybe not well enough rinsed after dyeing. Another good finisher says that the fault may be due to using condensed steam in the shape of water from the engine room in washing the goods.

Softener for Cotton Goods

Could paraffine wax and stearic acid be used as a softener for cotton goods after bleaching without injurious effects? The cotton is bleached by the lime process. (3279)

Neither paraffine wax nor stearic acid can serve well as softeners without the addition of other substances. When used in combination with size compositions, these substances act not only as softeners but as lubricants, preventing the goods from sticking to the cans when the cloth passes over the dryers or through the calenders.

White Specks in Wool Mixes

I am enclosing two samples of wool; one containing small white specks picked from the roving of a 10 per cent. mixture. These specks appear quite prominently in the cloth when finished. The other sample shows the white wool used in the above-mentioned mixture. Any information as to the elimination of these specks will be much appreciated. (3353)

The sample of white wool contains some short staples or undergrowth, but it does not appear to the extent that it should not card out clear. However, at times this is a serious difficulty to overcome as the short staple has a tendency to roll or curl up in the form of small nibs or pills which are almost impossible to card out, and are responsible for specks in the finished cloth.

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The cards should be clothed with fine close-set wire for mixes and set down as close as possible to run without striking the points. In order to get down close enough to bring about the desired results, the cylinders and rolls must be perfectly true and level. The cards should also be ground sharp and smooth. Preferably, the first and second breakers clothed with No. 35 wire and the finisher with No. 36, with a No. 34 tempered steel straight wire, open set fancy ground free of needle points and smooth, run at a proper speed to raise the stock and prevent it from rolling in the cylinder. By using the fine clothing, the idea is that the more points of contact in a given space the more chance of straightening and combing the short fibers out and holding them in position, thus preventing rolling or felting into nibs, which is likely to occur with coarse, open set clothing on this class of work.

The proper adjustment of the feed rolls, leader-in and tumbler, also the small fancy, are very necessary in thorough carding. In fact, it is well said that part of the carding is accomplished at this point. It stands to reason if stock enters the carding irregularly or in a deranged condition, it is bound to show ill effects in the roping. The feed rolls should be absolutely true and level, clothed with diamond point metallic clothing, so that there will be no give. They should be set as close as possible in order to hold the stock while it is being combed away by the leader-in. It is very important that the speed of the leader-in be adjusted to clear the stock away from the feed rolls evenly and uniformly, as this is an important point in combing out and blending the stock.

A good method in setting feed rolls is to place a piece of wrapping paper between each end and in the center, turn the rolls and the imprints will indicate the adjustments necessary. The feed on the Apperly table should not be heavier than is necessary for even work, as too heavy a feed will spring the feed rolls in the center, causing uneven work. The tumbler should be true and level, ground sharp and smooth, and set as close to the cylinder as possible. The leader-in and lower feed rolls should be set close to each other and to the tumbler as it is possible to run without striking. The small fancy should be set to raise the stock on the leader-in, so that the tumbler will clear the leader-in and deliver the stock to the cylinder open and free of bunches. The small stripper should be set close to the top feed roll and the leader-in.

For mixes containing a small percentage of white, it is ad-

visible to card the white through the first and second breakers before picking. The breakers should be set down close.

Producing Clocking on Hosiery

Enclosed you will please find a sample stocking with clocking up the sides. We are anxious to know on what make of machine this stocking was made as the clocking appears to have been knit in the fabric. Also could you give us any information regarding the use of the sewing machine to produce this effect, as we understand it is being done by some firms in that manner. Any information you can give us will be greatly appreciated. (3342)

To our knowledge there are only two machines that knit-in this work complete. These machines are built for the special use of two mills and are not on the open market. There are other mills running what is now considered an old style revolving cam head machine that makes a straight line effect by revolving a small bobbin of the color desired and raising two or three needles with special butts high enough to take this yarn at the required time. To the straight line effect, the finish at the top is added by hand.

Other manufacturers are getting a similar effect by embroidering on machines supplied by either the Merrow Machine Co., Hartford, Conn., or the Union Special Machine Co., Chicago, Ill. For knitting-in the clocking, it appears that this work can be done more easily and to better advantage on the old type revolving cam head machine.

Equipment for Knitting Children's Hosiery

Can you give us information regarding the equipment needed to knit children's hosiery? (3305)

To manufacture a complete line, footers of five sizes are necessary as follows: $2\frac{1}{4}$ inches, $2\frac{1}{2}$ inches, $2\frac{3}{4}$ inches, 3 inches and $3\frac{1}{4}$ inches for making sizes from 4 to $8\frac{1}{2}$.

If children's footing-off work is to be made five sizes of ribbers will also be necessary, comparing with the size and number of needles in the footers. It is customary, as a rule, to have one-half as many more needles in the rib top as there are in the footer allowing every other stitch to be doubled in transferring, and giving a very elastic leg to the stocking.

If misses' string work is to be made, a ribber will not be

necessary, but a welting machine will be required for sewing the top; loopers will be needed, of course, for closing the toe. In addition to the above, if complete equipment is figured on for finishing, it will be necessary to have dyeing machines, drying machines, presses, boards, etc.

Substituting Reed of Different Number

On some of our goods we are using a No. 9 reed with 4 threads per dent. We are short of this number but have a large stock of No. 8 reeds. Can this be used in place of the No. 9 and if so, how many threads should be drawn in per dent? (3244)

The No. 8 reed can be used in place of the No. 9 reed on carded woolen goods and a very simple calculation will give the number of threads to be drawn in through each dent. The present method of drawing 4 threads through a No. 9 reed gives 36 threads per inch. By a little exercise in arithmetic, it is found that by drawing 4 threads in one dent of No. 8 reed and 5 threads through the next dent there will be 72 threads in every 2 inches of reed space, or an average of 36 threads per inch, the same as with the No. 9 reed drawn 4 threads in every dent.

This arrangement with a No. 8 reed will be perfectly satisfactory on most woolen goods, but on some classes of worsteds it would be better for the inquirer to buy the required number of new reeds of the original gauge and weave all the goods under the same conditions.

Contraction in Doubling Cotton Yarn

We have a customer calling for 2/40s yarn, 30 turns to the inch. Please advise us what the size of this yarn should be after twisting? What is the customary allowance for contraction on counts ranging from 10s to 40s, where there is such hard twist as mentioned above? (3329)

If the count of the 2-ply yarn is to be exactly double that of the single yarn; for example, if 2/40s is to equal single 20s, the spun count of the single yarn must be somewhat finer than double the count of the ply yarn. How much finer depends entirely on the kind of twist, that is, on the amount of twist in the ply yarn. The harder the ply yarn is twisted the coarser will be the count. With hard yarn the turns lie flatter than when the yarn is soft twisted. It is clear that a greater

length of single yarn is necessary to produce a given length of ply yarn if the latter is twisted hard than if twisted soft. This fact is well illustrated when taking twist out of ply yarn by means of a twist counter. As the twist is removed the ply yarn becomes slack. The twist in the single yarns has a bearing on this question. We believe the inquirer can work out some useful information by referring to an article entitled, "Elongation and Contraction in Ply Yarns," which appeared in our July 14, 1917, issue.

Strength of 3-Ply Sewing Threads

I understand that thread has a standard strain which each count will stand without breaking. For instance, that 3-ply 60's thread made from combed yarn should stand a strain of $3\frac{3}{4}$ pounds; 3-ply 70's should stand $3\frac{5}{8}$ pounds. Is this correct? I want to buy some thread and was offered a line today, but it seemed very weak. The salesman said it stood the test. What is the breaking test for 3-ply 60's and 3-ply 70's?

(3314)

The strength of 3-ply sewing threads will vary with the quality of cotton fiber used, presuming each has the required amount of twist. The strengths the enquirer mentions suggest either an Egyptian or a Sea Island combed thread. These again will vary if plain or if sized and polished. The following are the approximate weights a single thread should support before breaking:

EGYPTIAN		
	Plain	Sized
3-60.....	3.25 lbs.	3.50 lbs.
3-70.....	2.9 lbs.	3.2 lbs.
SEA ISLAND		
	Plain	Sized
3-60.....	3.50 lbs.	3.75 lbs.
3-70.....	3.3 lbs.	3.5 lbs.

Stiffening Cotton Twine to Imitate Hemp

We are using No. 8 count yarn 10-ply, and No. 2 count yarn 3-ply, twisted very hard. This cord we size and polish, but we wish to obtain a very stiff finish, similar to the finish which is put on twines made from jute, hemp and flax. We have tried various gums and glues, but without success, and we are almost led to believe that it is impossible to stiffen the

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cotton fiber to any great extent. We are after a real wiry finish. We are enclosing sample of the yarn showing finish we are now getting and sample of yarn showing finish we would like to get. (3263)

The stiffness of twines made from the bast fibers does not derive purely from finishing. Every individual fiber of hemp or jute is coarser and stiffer than cotton fiber. The fibers are also longer than in cotton yarn and in trying to copy hemp in cotton the inquirer is attempting the reverse of the usual proposition. No guarantee of results can be offered with the following suggestions, which are only made in case they should prompt experiment with untried agents.

In using glue the effect of adding $\frac{1}{2}$ to 1 per cent. bichromate of potash might be tested. Albumen is a possible material and its stiffness is increased by drying with the aid of heat. There are water mixtures that have more or less of the character of spirit varnish and which come cheaper. One such is made with shellac, borax and water by boiling them together until the shellac is dissolved. Glucose and gum arabic can be used with water to impart stiffness; or by simply boiling dextrine until a clear fluid is obtained a brittle stiffness can be lent to thread. The tendency of hard substances to crack off cannot be ignored and it is possible that the finish might suffer from subsequent winding or balling.

Equipment and Output of Small Hosiery Mill

What equipment will I need for a small hosiery mill of about six 200-needle Banner machines? What will the output of these machines be, running nine hours a day on ladies' and half hose? How many pounds of yarn will the six machines consume in nine hours' run? (3271)

We referred this inquiry to the Hemphill Manufacturing Co., Pawtucket, R. I., manufacturers of Banner machines, who reply as follows:

"Relative to the output of six 200-needle Banner machines, we can state conservatively that their production on ladies' work in a 9-hour day would be 4 dozen pair, while on half hose for the same length of time, with an operator doing her own transferring, between 5 dozen and $5\frac{1}{2}$ dozen pair, depending upon the ability of the operator.

Assuming that a 30/1 combed peeler would be a fair size to fill this gauge, these machines would consume on half hose about 30 pounds of yarn per day, and on ladies' nearer 35 pounds.

Shellac Sizing for Felt

I would like information on the process of dissolving shellac to make a sizing for wool felt; also on the methods of sizing felt with shellac, glue or starch. (3215)

Shellac is easily soluble in spirit and may also be dissolved by boiling in alkaline solutions. Borax, ammonia or soda crystals may be used, and borax is to be preferred. The best known use of shellac in connection with felt is in the hat trade, where it is used to stiffen hat forms. A solution of the consistency of syrup is made with the methylated spirit and into this the hat is dipped. The surplus is wiped off and the hat is put into a stove where the spirit is vaporized and continuously recovered. The hat is left in the open air to lose its odor and is then sandpapered and brushed and blocked to shape. The dipping is done after dyeing and the effect is to make the form intensely hard. The subsequent processesellow the stiffness.

Without a knowledge of the kind of felt in question or the effect desired, it is difficult to give any useful advice. Shellac would not seem an eminently suitable material for treating pieces of felt in continuous machinery, and a glue or gelatine size appears to be generally a cheaper and more rational substance to employ. It can be added that efforts to impregnate felt in the tank and squeeze machines used for cloth have resulted in pulling out the length and contracting the width of the goods inordinately. Obviously the circumstances vary with the kind of felt and degree of impregnation required, but all felts will be distorted more or less by severe treatment.

Dyeing Wool Containing Tannic Acid

Enclosed please find sample of tan colored wool that has been obtained by boiling sheepskin clips in solution of sulphuric acid and water. The hides of these skins have been tanned and contain tannic acid. On coming into contact with bichromate of potash or soda, the shade is changed to a very dark brown which makes it unsuitable for dyeing even medium shades. What can I treat the stock with before dyeing so as to eliminate all traces of the tannin so as to allow me to dye any shade on it. (3218)

Wool which has absorbed tannic acid in any form becomes resisted to dyeing; therefore it is necessary to destroy all traces of the tannin before good results in dyeing can be ob-

tained. By treatment with bichromates and acid in the same way that shoddy is stripped, the tannin can be put in a comparatively harmless condition and the stock can be dyed with natural and mordant dyes. The color can also be removed to some extent by boiling in bisulphite of soda and acid. Better results are obtainable by the use of hydrosulphite. In all these cases it becomes a question of whether the process needed to lighten the color will not increase the cost too much. It would seem better to use such stock entirely for dark shades, using better stock for the light shades. In other words, there is no cheap practical process available, and the cost of improving this material would overbalance all other considerations.

Creases and Flared Tops on Ribbed Hosiery

We are enclosing you a sample of our bleached ribbed hosiery. You will notice creases all through the leg of the stocking, also that the top is flared out very badly. These creases occur in all of our bleached ribbed hosiery, also it seems impossible to board this hosiery without pulling the top open too widely. Can you give us any information on how to stop this trouble, also is there any way that we can put elasticity into bleached hosiery? (3284)

The creases in the leg of the sample are due to the stockings laying in a compact wet mass before being placed on the drying forms. When taken out of extractor they should be shaken into the truck and then dried as quickly as possible; they should not be extracted too dry.

When cotton is bleached the elasticity can be renewed to some extent by giving the hose, after bleaching, the scroop treatment, which is used on mercerized hosiery. This will tighten the stitch and avoid the flaring out of the top if carefully boarded on the drying frames.

Waterproofed Netting

Enclosed please find a piece of netting that has been waterproofed. Can you tell us how this is done and what chemicals are necessary for this treatment? (3269)

An examination of the sample submitted seems to indicate that it has been impregnated with a material containing a high percentage of paraffin. Although this is a light and comparatively delicate fabric, the same rules will apply to it as to heavy canvas. This subject was very thoroughly covered on

page 43, TEXTILE WORLD JOURNAL, May 18, 1918, and practically nothing can be added at this time. These goods could be dyed with a sulphur color and afterward run through hot melted paraffin, or instead of dyeing they could be saturated with a solution of asphaltum and paraffin in a suitable solvent or in the melted condition. When solvents are used they give rise to many difficulties on account of their easy inflammability and the possibility of leaving a disagreeable odor in the goods.

Specks in Carded Cotton Web

The webs from some of our cards working on 1½ inch cotton contain too many specks and particles of foreign matter and are generally rough. Small white specks composed of fibers rolled up into ball form are very evident. Are there any general directions you can give us that may improve the work? (3328)

The causes of foreign matter or specks are generally that cards need grinding and setting or are overcrowded. A large production may be obtained at the expense of bad work. The little balls of fiber are probably caused by the working surface being too far from the cylinder. The web will look rough if the comb is too high. If it is too low the stock may go around the doffer. The stock will sometimes roll up under the comb and drop on the floor. This is caused by a lack of humidity or by allowing the room to become too cold. This often happens on colored or bleached work. If the comb cannot be set to handle the stock the only remedy is moisture.

The settings of a card for 1½ inch cotton should be as close as possible without touching. Following is a practical table of settings, given in 1000th of an inch.

Feed plate and licker.....	.012 inch
Mote knife and licker.....	.012 inch
Licker screen nose.....	.009 inch
Licker screen back.....	.125 inch
Cylinder and licker.....	.009 inch
Cylinder screen.....	.032 inch
Cylinder and back plate.....	.017 inch
Cylinder and tops, back.....	.010 inch
Cylinder and tops, front.....	.007 inch
Cylinder and doffer.....	.005 inch

The cylinder and stripping plate should be set about 17/100 of an inch, or according to the amount of strips to be taken out with the tops. When the top of the front plate is set close

to the cylinder, and the fibers cling to the cylinder, the tops are usually light. When the plate is set away from the cylinder it allows the fibers to cling to the tops and they are removed by the stripping comb as waste.

All machinery, and especially a card, should be kept in the best possible condition. That means it should be cleaned often and kept well oiled. Grinding should be thoroughly done and the settings looked after. It is well to grind over the cards once every four to six weeks, setting the principal points each time, and at least twice a year to take out the screens and give cards a thorough overhauling. The grinder can so time his work as to overhaul one or more cards every time he grinds around and will thus always have his work in shape.

Manufacture of Cotton Warp Men's Shirtings

I am enclosing you some sample pieces of cloth that have been sent in to us from time to time urging that we try to make this fabric, saying there was a great deal more money in this cloth business than there is in the blanket business, and that the demand for the cloth is unlimited. You will notice the colors are oxford, brown and green.

Now, we have never made anything here but blankets, and our weaving end is not what it should be; that is, we do not have what you might call skilled weavers. They know enough to put the shuttle in the box, and that is about all.

We wish you would please advise us what you think about our trying to make this kind of cloth, giving your views of the matter, also giving construction of this cloth, as near as you can, and the usual weight per yard. Our prospective customers want it in three colors such as we are enclosing.

We judge the warp to be about an 18s single cotton, with filling of about a 14 cut. We do not think the filling is all wool; it may possibly have a trace of cotton in it, but we hardly think so. We have looked it over very carefully, and we would judge it to be about 75 per cent. wool and 25 per cent. shoddy.

We would certainly be extremely obliged to you if you will look these samples over very carefully and give us your views of our making this cloth with our inexperienced help, etc.

(3309)

The samples are men's shirtings made according to the idea of saving wool now being carried out in many fabrics. They may be considered as standard in every respect. There is a larger demand for such stuff than can be supplied, at prices which insure a good profit. A black cotton warp is entirely

hid by the lighter shades of filling made in wool mixtures, which show up clean and lustrous, and the feel of fabric is suggestive of being composed of all wool. This of course is mainly on account of the comparatively light weight of cotton yarn.

There should be no serious difficulty in producing such goods in a mill equipped and organized to make blankets. The plan of weave is the simple four harness twill, and the cotton warp ought to run well in the loom. As the filling is all one sort of yarn, weavers skilled enough to weave blankets should be able to turn out good cloth. But it will be well for the superintendent of weaving to give intelligent instructions as to the requirements of the work, and keep strict supervision while it is being accomplished.

There are 2,560 ends of warp in the finished cloth at 56 inches wide. This is black cotton yarn, size 1/15s. The filling is calculated to be made from a stock mixture of 50 per cent. wool and 50 per cent. shoddy, spun to $1\frac{3}{4}$ runs and twisted to the left; average quality one-quarter blood; also $2\frac{1}{2}$ per cent. of white fine B super pulled wool used in each shade of mixture. This white wool enlivens the shade and gives the luster; also is effective in keeping the small seeds and specks in the stock from showing up in the cloth. The warp is estimated to have been laid 71 inches wide through a No. 9 reed, 4 threads in a dent. 40 picks per inch are woven in. The style of finish is natural, and fulling can be done only in width. The goods should gain a little in length in the finishing on account of stretch. The samples actually weigh $15\frac{3}{4}$ ounces per yard at 56 inches width.

Weaving Artificial Silk Warp

I beg to ask if you can give me any information about preparing and sizing artificial silk. I have been running 150 denier viscose silk as top beams in cotton shirtings, but without much success. I have tried running them without sizing, but the individual fibers that make up the end seem to separate, chafe in back of the harness, and, of course, make bad work. I have also tried sizing these warps and used practically the same method as sizing cotton top beam warps. This seemed to improve the running of the work; but I am inclined to believe that there must be some special size that can be used to make this silk run as well as cotton top beams. If you can give me any information about the preparation and running of this artificial silk work you will very greatly oblige.

(3310)

It is possible that you are attempting too much in trying to run 150 denier artificial silk in the warp. This size would be suitable for filling but for warp 2/150 denier would be better. We are not in touch with any mill that is sizing this material before weaving, and the writer has some doubts as to whether such an operation can be accomplished successfully. Artificial silk fiber when moistened is reduced in strength, and it is very necessary in handling it in warps to keep water away from it. In weaving cloth in which artificial silk is used it is not good practice to have the floats in the design too long, owing to this reduction in strength when wet. We would think that the luster of the artificial silk warp yarn would be greatly impaired by sizing. The 2/150 denier yarn would not need sizing, and if there are not too many picks in the cloth it should stand up all right in the loom. About 88 picks per inch with a 40s cotton warp and filling as a ground is about the highest number that can be woven in ordinary weaves.

Directions for Dyeing Cotton Ducks

What is the best method of dyeing heavy, close-woven cotton goods, such as heavy ducks, to insure perfect penetration?
(3346)

Closely woven cotton goods such as heavy ducks are dyed in one of two ways, either in a jigger or padding machine. The former is the apparatus most commonly employed on account of the better facilities it affords for securing good penetration. As penetration is a factor of density, the closeness of the weaving may not have as much influence as the hardness of the twist of the yarns used in the goods.

Sulphur colors yield superior results on account of their solubility, which should always be taken into consideration where penetration is necessary. The use of soluble oil is always advisable as an addition to the dye bath for dyeing all shades, although it is especially desirable when dyeing medium, light and mode shades. It is a mistake to use too strong a solution of dyestuff and attempt to get the full shade in a short time. It is better to use a solution of moderate strength and give a few more runs of the goods through the bath.

As dyeing usually takes place at or near the boil, it is well to commence operations at a low temperature, say 100° F., and gradually increase to the boil, at the same time "forcing" the bath with small additions of common salt.

Yellow Streaks on Printed Goods

As subscribers to your paper we should thank you to let us have your report on the enclosed sample which shows yellow streaks right across the piece at certain intervals. The enclosed sample has been returned to us by one of our customers in South America, and we should like to know whether these streaks are due to change of climate, or perhaps to the fault of bad printing. (3295)

A test of the coloring matter used in printing the background color of the fabric shows that the dyestuff is destroyed and turned to a yellow by even weak solutions of caustic soda. As this change is not produced by ammonia or other weak alkalies, and as the stains on the goods show that they cannot be restored by the application of acids, it is fair to assume that the stains on the goods were produced by actual contact with caustic alkali. An investigation of the materials with which these goods are in contact might throw some light on the subject.

One point which would stand investigation is the subject of paste used for labels. There are on the market some so-called label pastes or glues which are simply solutions of sodium silicate and very strongly alkaline. Others are solutions of casein, and sometimes starch, in both caustic soda or silicate. If a package containing a label pasted with these materials should be placed in a damp locality it is quite possible for the strong alkali to act on the goods or the color. We would not consider the printing of these goods defective in point of fastness, but consider that they have been subject to extraordinary conditions which would be likely to discolor practically any cotton dye.

Bleaching Linters

I am boiling linters in a boiling kier, bleaching the material afterward. I am enclosing a small sample of the stock bleached and would like to know the cause of the tint in it. You will note that the fiber is damaged, but this was done by the bleacher in trying to overcome the yellow shade. (3262)

It would seem that the yellow shade is caused by the material not being boiled long enough, or else the goods are boiled too long in one liquor, and in that case no amount of chemic will give the white shade desired. If the goods are not being boiled long enough, try letting them stay in the kier

another hour, and if the yellow shade is still there, then note the color of the liquor as it is drawn off. If it is a dark brown shade, the goods should be boiled only about two-thirds the time of the original boil. Draw off the dirty liquor and flush the kier for a few minutes, then mix a weak solution of ash and soap, or some other bleaching assistant, and boil for the other third or a little longer if necessary.

If the goods are thoroughly bottomed in the boiling process they require less chemic in the bleaching process. If the material is very dirty about 3 per cent. of caustic would be required and 2 per cent. of soda ash in the first part of the boil. After the flushing use about 1 per cent. of soda ash and 2 to 3 per cent. of soap or bleaching assistant, not using any chemic in the last boil. If this does not give the desired whiteness, mix in the chemic 2 per cent of soda ash and use this in the chemic bath, using it at the same strength as if there was no soda ash in it. This will give a good white, but care must be taken of the goods as they are taken out of the kier.

If the goods are a good color they will not require the same strength as goods that are a bad color when they come out of the kier. One thing is certain: if the goods are not bottomed in the boil, whether it is raw stock, yarns or piece goods, no amount of chemic will bottom them afterward. It will whiten the goods a little, but they will not stay white, simply because they are forced, and in a very short time they develop the yellow shade like that of the sample sent.

Recovery of Caustic

We plan to install an apparatus for mercerizing 2,000 pounds of yarn per ten hours. With the reclamation of caustic to an extent commensurate with the production mentioned above, what will be the average amount of NaOH consumed per pound of yarn? (3285)

Without knowing the details as to how the yarn is to be mercerized, no exact figures can be given, but it may be taken as an average, working with caustic soda solutions standing at 65° Tw., that for every 2,000 pounds of cotton treated there will be required in the bath about 1,000 pounds of alkali.

Regarding the amount of caustic recovered, this will depend very greatly upon the efficiency of the recovery plant. After the yarn has been mercerized the excess of alkali is removed by both squeezing and washing. The alkali liquor that is re-

moved by squeezing is much stronger and can be brought up to the original strength by the addition of fresh caustic, but that which has been removed by washing will, in consequence, be weak. These weak liquors are, as a rule, so diluted that it is best to evaporate them down to small volume and re-use them after restoring their strength.

It has been recommended to collect the stronger washings and make a solution standing at about 24° Tw. and boil with slaked lime to causticise, then allow the excess of lime to settle, draw the clear liquor off, and evaporate further to 60° Tw. This will yield a strong caustic liquor suitable for further use. Weak caustic liquors can be used for dissolving fresh caustic, which will aid in reducing costs.

The actual amount of caustic soda used in the process of mercerizing any given quantity of cotton, under the conditions named, can only be determined after the plant has been in operation for a short time.

Distinguishing Linen and Cotton in the Same Fabric

How can it be determined whether a fabric is pure linen or part linen and part cotton? (3267)

The most positive means to detect linen in the presence of cotton is by means of the microscope, but without this instrument other tests must be applied. The simplest of these are testing by tearing, linen being stronger than cotton, and giving a duller sound when tearing; testing with ink, a drop of ink spreading in all directions if the fabric is all linen, but spreading in the direction of the linen threads in a mixed fabric; and testing by burning, the ends of the linen threads after the flame has been extinguished being round and smooth, while the ends of the cotton threads separate more or less in the form of pincers. There are various chemical tests, the most important of which were described in an article in the July, 1913, issue.

Silk and Mercerized Yarns for Ladies' Hosiery

The writer is contemplating the manufacture of ladies' hosiery in silk and mercerized cotton yarn. We will want to make a hose to weigh about 12 to 16 ounces to the dozen pairs. Can you give us the information regarding the quality of the silk and the size used, also the mercerized yarn to be

used in the heel, toe, double sole and garter top? We will want this stocking to retail at about \$1.00 to \$1.50 per pair. (3292)

The writer does not state whether he wishes to manufacture full-fashioned ladies' hose or seamless. However, we take it for granted that it is the intention to manufacture seamless hose. The quality of silk to be used for this class of hose is what is known generally as Japanese tram, a nine thread silk. Kanasai best No. 1 grade will give very satisfactory results. The mercerized yarn to be used in the garter top should be a 40/2 ply combed peeler mercerized. The yarn for the heel and toe should be two ends of 60/2 ply mercerized. The splicing yarns used in the high spliced heel and double sole should be 60/1 mercerized. These goods should be knit on a 220 needle, $3\frac{3}{4}$ inch machine. The silk boot should be 18 inches in length, and the mercerized yarn should extend 5 inches below the double top.

Effect of Concrete Floors on Weighted Silk

We take this opportunity to ask you whether our concrete floors would have any deteriorating effect upon weighted silk. One of our foremen has made this contention and we would appreciate your advice on same. (3277)

This question might profitably form the subject of a thorough investigation, and although an answer is given it should be taken for what it is worth on account of the lack of definite data.

While it is generally known that weighted silk is very susceptible to all chemical influences, even common salt, it is quite improbable that any material is extracted from concrete which could do much harm. The wet silk is usually protected from actual contact with the floor, and if it is in a damp condition the course of the liquid would be downward. Neither can it be considered plausible that anything leaves the concrete in the form of a vapor and acts on the silk through the air. However, if hydrochloric or other acids were spilled on the floor they might vaporize, and it is a well-known fact that silk will absorb acid vapors quite readily.

Sheeting Constructions

I would like to have the construction of the gray cloth, width, count and weight of wide sheetings, especially the 7/4 width, or 63 inch, and 10/4 width. Some sheetings are heavy and some light. I am interested in the lighter goods which would weigh perhaps as light as 2.50 yards to the pound in

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63-inch. The well-known brands I have in mind are:

Dwight Anchor, Pequot, Pembroke, Wamsutta, Pepperell, Lockwood, Utica Steam Mills.

No doubt, there are various others. Prices on these are quoted in various textile papers, but without the discounts. I presume the discount would be 10-5 and 2½ per cent. If therefore I had the constructions and could ascertain the quotations from time to time, it would give me a line on the prices of goods of this class. Apart from the above, if you happen to know of any list that is published giving the constructions of gray goods, i. e., the ordinary unbleached sheetings, sold to the jobbing trade under different brands, I would also be glad to have that information. (3385)

Knowing of no list which shows the constructions of the various well-known brands of sheetings, we have endeavored to obtain the information desired by analysis of samples of 10-4 unbleached goods from several different mills. It is possible that this method of procedure may prove inequitable in some cases, since the sample analyzed might prove to be of slightly better or of slightly lower quality than the commercial run of the goods in question. However, the results should approximate the information desired.

RESULTS OF ANALYSIS OF 10/4 GRAY SHEETINGS

Name	Width	Texture	Weight
Utica—Utica S. & M. V. Cotton Mills	90	68 x 68	1.18
Mohawk—Utica S. & M. V. Cotton Mills	90	68 x 68	1.38
Pepperell—Pepperell Manufacturing Co.....	90	64 x 66	1.48
Lockwood—Lockwood Co.....	90	72 x 76	1.27
Dwight Anchor—Dwight Manufacturing Co.....	90	70 x 72	1.18
Pequot—Naumkeag Steam Cotton Co.	90	68 x 72	1.37
Colonial—Androscoggin Mills.....	90	70 x 72	1.30
Fruit of the Loom—B. B. & R. Knight	90	80 x 92	1.45
New Bedford—Wamsutta Mills...	90	80 x 92	1.50
Wamsutta Percale—Wamsutta Mills	90	96 x 108	1.58

In the writer's judgment all of the samples above analyzed consisted of carded yarns, with the probable exception of the "Wamsutta Percale," the appearance of which seemed to in-

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dedicate that combed yarns were employed in its manufacture. From the information which has been presented, the approximate number of yards to the pound in the 7-4 width can readily be obtained by calculation. The following are the various weights of the 7-4 goods, as calculated:

Utica	1.68
Pepperell	2.10
Colonial	1.85
New Bedford	2.15
Dwight	1.68
Mohawk	1.97
Lockwood	2.00
Pequot	1.95
Fruit of the Loom.....	2.07
Wamsutta Percale	2.25

Worsted Dress Goods Shaded Across the Width

We are sending you a piece of cloth that is shaded across the width. The peculiar thing is that the part of the sample that appears darker when looking from one direction is lighter when looking from the other direction. The dyeing and finishing would not cause so clean cut a shaded portion, but we can see nothing in the yarns that would cause it either. (3387)

The trouble of this inquirer is due to yarn of reverse twist being mixed in the filling, and he should locate the trouble in the spinning room as quickly as possible, if it has not already been detected there.

Setting a Worsted Card

We are having trouble with the web dropping and making uneven sliver in our carding. The cards are 50 x 50 with 30 wire on cylinder, and making 60 revolutions per minute. Sample of the stock is enclosed. Please give me the speeds and settings. (3384)

There are several things that might cause the web to drop, making uneven slivers. The speed of the card and the setting of the cylinders may be just right for the wool that it is intended to card, but the wool may have been handled wrong in the scouring process. The carding should not be blamed until it is found that the wool is coming to the cards in the best possible condition. Poor or harsh scouring may cause much difficulty in carding, especially in removing the wool from the doffer. The sample enclosed is quite harsh and I would sug-

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gest that great care be exercised in the scouring process. In wool scouring use as little alkali as possible, the less the amount that is used which will leave the wool clean, the easier will be the carding process, with less likelihood of the trouble of having the wool drop on the floor from the doffer. Wool that has been harshly scoured will not stick to the wire as well as does wool that is soft, and this also causes the web to drop on the floor. If, however, the wool is greasy, alkali should be used, for greasy wool gums the cards and numerous difficulties will arise.

If the wool is clean, examine the fancy and see if it is true. By this, I mean, see that each end and center of the fancy is the same distance from the main cylinder so that the stock will be raised evenly. If the fancy is not true, the clothing should be removed and the fancy trued upon a lathe. A fancy that is not true will sometimes raise stock in places away from the cylinder, and, naturally, the first chance it gets, the stock will drop to the floor.

Next, see that the wire is not jammed up on the sides of the fancy. If it is, have it fixed at once, for a jammed fancy will not lift the wool as freely in the jammed places, thus causing the web to break on the sides of the doffer and fall to the floor, causing uneven sliver. Next, be sure that the doffer is in good working condition and not set too far from the main cylinder; also that the wire points are not dull.

Carders will differ in setting a card, but it has been my experience on different wools that a good set, and one that will apply to the enclosed sample, on a four lickerin and two cylinder card, is as follows:

1st lickerin	22 gauge
2d lickerin	22 gauge
3d lickerin	24 gauge
4th lickerin	24 gauge
Top divider	24 gauge
Bottom divider	24 gauge
Workers	24 gauge
Strippers	22 gauge
Doffer	24 gauge
Angle striper	24 gauge
Workers	26 gauge
Strippers	24 gauge
Doffer	26 gauge
Comb	24 gauge

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As far as the speed of the cards is concerned, they could be run with safety at from 85 to 90 revolutions per minute. This would give more production. Running the cards at 60 revolutions per minute, as stated in the inquiry, would give as good work as at a faster speed, but in this age where production means so much, they could be run from 85 to 90 revolutions per minute.

Bleaching and Finishing Crepes

Please give me some information regarding the bleaching and finishing of crepes; that is, producing the crepe finish on the goods after they are bleached. (3390)

This is a very difficult finish to get on cotton goods. It is done in about the same way as mercerizing, with the exception that the goods are passed through the caustic solution between 20° to 35° Be. without tension so that the crepe finish or crimping is shown to good advantage. It is necessary to have experienced help for this class of goods.

Crepe cloth should be bleached in a cold solution of hypochlorite of soda. After the goods are white enough, they are washed and scoured either in a bath of sulphuric or hydrochloric acid to neutralize the effect of the bleach. The great secret in finishing crepe is to restore after the bleaching and sizing the crimping feel and appearance. Some bleachers adopt the method of passing the goods without tension over perforated steam pipes, face side up with a good blow of steam to raise the crepe effect after the goods are sized and ready for finishing. Some finishers pass the goods through an ordinary jigger without tension, in a solution of gum resin or resin soap and soda ash, the resin having a contracting effect on the material, and helping to produce the crepe effect on the goods.

The inquirer should try the different methods and adopt the one that suits him best, continuing his experiments until he gets the best possible finish on the goods.

A finisher to whom this question was submitted replies as follows: Crepes should be shrunk before they are bleached to give the crepy appearance. They are then tied into 100 to 140-yard lengths and boiled and bleached with as little handling as possible. After they are bleached the goods should be washed and blued in an open soaper with as little tension as possible. They are then finished on a tentering machine to the required width.

Hosiery Damaged in Bleaching

Under separate cover I am mailing by parcel post a bleached stocking and I will appreciate it if you can tell me the nature and cause of the holes and yellow stains. The goods are bleached by the peroxide of sodium method and we have this trouble occasionally. We bleach 1,200 pounds at one time and may find only one lot partly affected with the holes. (3273)

The holes in this stocking appear to be the result of the action of acid. Without a knowledge of all the details of operations as carried out in this plant, it is rather difficult to indicate a course to follow to get at the bottom of the trouble. Bleaching with sodium peroxide alone will not cause holes in the goods, but since sulphuric acid is used in the process, it is likely that some of the acid might be accidentally spilled in or about the place where the bleaching is done. Or it may be that batches of the stockings may be laid for a few moments only on some place where acid drops were splashed. It takes only a moment's contact with acid to injure silk, the hole may not show at once, but the damage is done that shows up later.

The stains are not iron, nor do they indicate tannin. They seem to point toward stains from wood that has been soaked in some acid liquor. Stains like these have been frequently noticed on silk that has been in contact with water-soaked wood.

It is suggested that in preparing the bleach bath, the goods be kept away from the vats until they are ready to receive the stockings, and at all times do not permit the stockings to remain on any table or platform or truck, unless they are absolutely clean.

Carbonizing by Chloride of Alumina Process

Recently we have had considerable trouble in retaining our black color in carbonizing black delaines by the chloride of alumina process. Considerable of the rags come out in the brown shade, and we find in a great many instances a large rag will be partly black and partly brown. As it is impossible to grade this class of material for shade after it is carbonized, this defect causes us a great deal of inconvenience and expense. Can you assist us in remedying our trouble. Your co-operation will be greatly appreciated. (3308)

As you probably know, whenever goods are carbonized by sulphuric acid there is always a percentage of brown out-throws. This is due to the fact that some coloring matters are

changed by the action of the acid. The use of chloride of alumina, as a general thing, does not affect the color. This is one of the strong points in its favor. It would seem, therefore, that if some of the rags are being browned it is probably caused by the chloride of alumina being too strongly acid. You, of course, know that in order to operate with alumina chloride the bath has to be kept on the acid side and it may be worth your while to ascertain whether or not this has been carried to excess.

In the case you mention, when a large rag will be partly black and partly brown, the probable explanation is that the coloring matter of the rag was not proof against acid, and that the black portion had not been subjected to the same degree of heat as the brown portion. This, of course, could easily happen by the rag being tightly over-laid in plaits.

Sizing Glazed Cotton Thread

Will you let me have a formula for sizing glazed cotton thread in sizes 2/22s to 2/50s? (3298)

One of the most important constituents of thread dressing is Japan wax, and the following is a very effective formula for a composition that imparts a luster of considerable durability to cotton thread:

5 gal. water
15 lb. Japan wax
5 lb. sal soda.

These are heated together until the wax has been completely saponified by the soda, after which it is diluted with a well-boiled starch paste to make 25 gal., when it is ready for use.

Another dressing is made by making a paste with corn starch in the usual manner, afterwards adding to every 20 gal. of paste:

7½ lb. of tallow
7½ lb. of soft soap

together with 5 lbs. of Japan wax, and 3 lb. of good clear glue, previously dissolved in a suitable quantity of water. To increase the luster, solid stearine may be substituted for the tallow. For a hard finish, potato starch is to be used in place of the corn starch. Instead of tallow, paraffine wax can be used; in fact, this is preferable, since it obviates any possibility of the size or dressing becoming rancid.

Brown Spots on Bleached Cotton Hose

The enclosed hosiery was bleached with lime in the usual way, after being boiled out with caustic soda in an iron kier. Kindly let us know what is the cause of the brown or yellow spots. (3380)

Chemical tests show conclusively that the spots on the hose are due to iron. The probable cause for their presence is direct contact with the sides of the kier. There is apparently no defect with the process of boiling and bleaching, since the white is very good. The goods are slightly harsh, but this condition is possibly the result of not having been softened.

The iron spots might be corrected in future batches by thoroughly cleaning the inside of the kier, and as a further precaution, having the kier lined with some cheap cotton cloth to keep the hosiery from direct contact with the wall of the kier. Of course, this expedient is possible where the kier is not too large.

Bleaching Mercerized Hosiery

I always read your question and answer department, and I am interested to know the formula of bleaching mercerized hose with bleaching powder or chloride of lime. (3399)

There are two ways of using chloride of lime for bleaching; one is directly in solution, and the other is to convert the lime compound into the corresponding soda compound. This latter method, while requiring more time, produces a bleach liquor that is much more cleanly than the former method. Besides, it removes the possibility of the presence of lime salts in the finished goods, which always tends to impart a harsh feel.

Chloride of lime solution should be used at a strength of about 2° Tw., while 1½° is better. As a matter of fact, goods made of fine yarns do not require a strength greater than ½° Tw. For mercerized yarns it is well to operate along the principle of weak bleach liquors, longer immersion. This correspondent does not indicate how much he proposes to bleach daily, and consequently no idea can be given as to how he should work. With relatively small lots, he might do well to bleach in rotary washing machines, and obtain very good results. Dissolve the bleaching powder in water with constant stirring, and then allow to settle for a few hours, and then draw off the clear top liquor into a clean cask or vat, and dilute it to about 6° to 7° Tw., when it is ready for use as the stock bleach liquor.

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For actual bleaching, a sufficient amount is taken and further diluted to, say 2° Tw., for the final bleach liquor.

If it is proposed to make use of the "hypochlorite" bleach, the bleaching powder is dissolved in water, and this solution mixed with a solution of soda ash, as described below:

Bleaching powder	100 pounds
Water	50 gallons

Work the whole into a thick cream or paste by stirring, taking care to break all lumps. Prepare a second solution by dissolving:

Soda ash	60 pounds
Water	25 gallons

Boil and add:

Water	12½ gallons
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The soda ash solution is poured into the solution of bleaching powder, the whole well stirred, and allowed to settle, and then the top liquor drawn off for use as the stock solution, after being diluted to 6° to 7° Tw. To the final solution add a solution of two pounds of soda ash so that all the lime in solution is completely precipitated. For use, this solution is diluted to about 1½° to 2° Tw.

After the goods have been bleached sufficiently, they are well washed with water, given a light sour, and finally washed with water to remove the last trace of acid.

Another correspondent replies to this question as follows: The general method of procedure for the bleaching of mercerized goods is applicable to the bleaching of hosiery, but in order to obtain the highest efficiency in the use of material, time and labor, one must adapt the conditions in his bleach house to meet the circumstances.

The bleaching can best be carried out through the employment of a washing machine such as is used in laundries. The wet goods are thrown into the machine until the barrel is about one-half full. From one to one and one-quarter degree of chemic is then run in until the goods are just covered. The machine is then run until the desired white is obtained, when the chemic is run off and the hosiery, well washed by running in water, leaving the outlet open with the machine in motion. The goods are then soured for five minutes with 2 per cent. sulphuric acid solution, after which the goods are thoroughly washed, as before, when they are removed from the barrel, hydro-extracted and boarded.

In carrying out this operation the chemic after use is run into a large storage vat, the size of which is equal to one-half a day's run. Here the chemic is brought up to strength by the addition of stronger chemic. Two such vats are used, as one is filling as the other is being pumped out for use. This operation is also true of the acid. By so doing the cost of operation is greatly reduced. Chemical control of the process will lead to uniformity and the runs can be depended upon for results.

Fireproofing Grass Matting

We enclose you a small clipping of our grass matting fabric. The War Department is asking us as to the possibility of fireproofing this. Can you put us in touch with any special concerns or technical laboratories to whom we could look for some assistance on this? (3402)

We believe there would be no difficulty in fireproofing this satisfactorily if the fabric is not subjected to washing during use. The difficulty in connection with fireproofing processes as developed to date has been the cost, and the lack of permanence of the fireproofing on goods that are washed. We should think the cost would not be a serious item in your case if the matting is to be used in winning the war, and as the nature of the fabric is such that it will probably not be washed, there would be no danger of the fireproofing agents washing out. A good laboratory for you to turn over this problem to is Arthur D. Little, Inc., Cambridge, Mass. Possibly they could give you full working directions for a process which you might conduct in your own factory.

Preventing Pipes in Dye House from Rusting

Kindly advise us if you know of any preparation that will prevent pipes in dye houses from rusting. When equipping our dye house, we painted the pipes with a graphite paint, which has proved useless. (3404)

We have sent the enquirer the results of tests with numerous paints on bleachery and dye-house piping. It cannot be said that any of the preparations gave absolutely satisfactory results. The real solution of trouble with rust on metal in dyeing, bleaching and wet finishing departments of textile mills seems to be in the use of rust-proof material for piping and other metal parts. Such materials are now readily available.

Uses of Kapok

Will you kindly advise if kapoc, or kapok, can be spun successfully; if so, to about how fine a count; and give the name of a mill spinning same. (3407)

So far as we know, kapok has not been spun in the United States. It is said that manufacturers in France have had some success in the direction of spinning the fiber into yarns, but it can be stated that much remains to be done before this can be regarded as a practicable proposition. The fiber is short and brittle, with a harshness that prevents its becoming matted; these properties commending it to the upholstery manufacturer as a stuffing for cushions, mattresses, etc. At one time a concern in Philadelphia gave some publicity to a so-called kapok fabric, but we believe this was made from fiber other than kapok.

Probably the chief uses of kapok during these war times is as a stuffing for pillows and sleeping bags for the army, and, on account of the low specific gravity of the material and its resistance to wetting as a filling for life-preservers. This latter use was discussed quite thoroughly in an article which appeared in TEXTILE WORLD JOURNAL of March 10, 1917.

Softening Bleached Underwear Fabric

We would like to have your advice as to the method of softening our bleached underwear fabric. Kindly note the following: We are boiling our lightweight fabric in a pressure kier; then bleaching in a stone cistern. After bleaching we pass through a string of five wooden open tubs, having a double set of wringers between each tub, thus handling the knit fabric in the string form. After leaving the bleach vat the fabric passes through a wringer continuously, and then goes into a tub containing the sulphuric acid bath, remaining twenty minutes, then several wringers through a plain water bath and into another tub with warm water and which should contain a softener; after remaining in this softener solution we pass through wringers and continuously through a plain water rinse, through a wringer into wooden trucks to go to our dry house. We have used neutral soap softeners furnished by several people, but we experience a bad result on account of the goods turning yellow afterwards, which means that the softening bath is alkali. When one softener is used a gummy scum rises to the top of the bath and which gets on the fabric severely injuring same, it being impossible to clean

out. Now we would like you to advise us what to use, whether turkey red oil or some neutral oil; and to also advise just how to apply same in connection with the system that we are using. (3400)

Taking facts as you state them, the technical inference would be that you are not washing your goods free from the sulphuric acid used. No softener will stand up against an acid condition in the goods. The softener is decomposed and the fatty matter it contains deposited on the goods. No subsequent washings in plain water would remove this material. We note that after placing the goods in the softener you rinse them off. There ought to be no occasion to do this as the value of a softener depends upon its remaining in the goods. It would seem therefore that if you thoroughly cleansed the material from acid before passing into the softening bath and used just enough softener so that it may be left in the material good results ought to accrue. A high grade turkey red oil made from castor oil, which would have no tendency to grow rancid if the goods were kept any length of time, ought to suit your purpose.

Regarding the bleaching operation, we assume that you are using the ordinary bleaching powder which is a lime compound. Good English practice in this class of goods seems to be inclining to the use of a soda bleach, and the substitution of muriatic acid for sulphuric acid. The reaction is quicker and the goods easier to cleanse.

Shrinkage of Cotton and Linen Fabrics

I am interested in the shrinkage of cotton and linen fabrics, and would like information on the following points:

1. What action takes place when cotton and linen fabrics are steeped in water (say, 4 to 6 hours) and then dried naturally and artificially?

2. Does the rate of drying make any difference to the shrinkage?

3. Is there any difference in shrinking properties in (a) ordinary cotton fabrics, (b) mercerized, (c) a fabric made from a mercerized cotton warp and ordinary cotton filling?

4. What process would you propose in order to obtain the maximum shrinkage? (3446)

These questions could properly form the basis of extended research work, as perhaps complete answers to them cannot be given by anyone. The construction of the yarns and the

fabrics would influence the shrinkage; also the conditions of weaving would be a factor. The following answers are offered and we would be glad to have them supplemented or criticized by readers:

1. Cotton and linen fabrics when wetted with water and dried naturally will shrink to a certain extent, depending upon the kind and weight of yarn in the cloth. These fibers when dried naturally give up their excess of moisture over the normal content, which is for cotton $8\frac{1}{2}$ per cent., and for linen 12 per cent. When these two fibers are dried artificially, and the total amount of moisture they contain is driven off, the shrinkage is slightly greater than when dried normally.

2. Opinions appear to differ as to the amount of shrinkage due to either slow or rapid drying. It would seem rational to believe that rapid drying would cause greater shrink in the goods than when dried slowly.

3. Cotton, not previously treated, shrinks about 6 per cent. Mercerized cotton, already freed from the natural impurities of the cotton fiber, does not have much to lose, consequently the possibility of further shrinkage is reduced to a minimum.

4. Fabrics made of both ordinary and mercerized cotton are likely to shrink more in the direction of the ordinary cotton. In the case cited, it would shrink more in width than in length.

Another correspondent replies to these questions as follows: Ordinarily, shrinkage applies to either weight or yardage. That is, the loss caused by process, or the yardage not restored or increased by mechanical means. It would appear from the run of the question that the information desired was yardage shrinkage, and from this point it will be considered.

The characteristics of fabrics as to processes are not covered and these govern the shrinkage to a great extent. That is, if the goods were lime boiled the shrinkage would not be as much were the goods given a soda ash or caustic boil. Then, the following points have to be considered: Cloth construction; twist; tight or loose weave; amount of handling required; staple of cotton used.

When either cotton or linen is steeped in water there is a slight shrinkage which is more pronounced through the use of artificial heat than when dried naturally. The rate of drying influences to some extent the shrinkage. By rapid drying the effect is more noticeable than by a slow and extended

operation. The greatest shrinkage would be noticed in (a), the next in (c), and least in (b).

To propose a process based on the information furnished is rather a difficult undertaking. By assuming that grey cloth is used of a short staple and coarse structure, a few hours in warm water, light squeeze, and rapid drying on a loose frame would give a maximum shrinkage of about 2 per cent.

In order to treat the subject in its proper light, all the conditions mentioned must be taken into consideration.

Steam Consumption in Drying Cloth

Can you direct me to any data showing steam consumption in drying cloth on machines of the can type? (3411)

An article entitled "The Thermal Efficiency of Cloth Drying," which appeared in our issue of March, 1915, gives data obtained in a series of tests made to determine the performance of cloth-drying machines of the can or cylinder type. The inquirer is referred to this article, which should be helpful in estimating probable steam consumption.

Filling Beating-Up Unevenly

You will note that the picks in the enclosed sample of worsted goods run in pairs, giving an effect in the filling similar to reed marks in the warp. To some extent this effect is overcome in dyeing and finishing the cloth, but regardless of this it should not occur in the weaving, yet we cannot stop it. Heretofore we have woven chiefly heavy goods, with fancy weaves. This cloth is a plain weave and has only 28 picks per inch. Is this effect common in light goods woven on the plain order? (3420)

Picks are very liable to run in pairs on light pick goods, made with the plain weave. The reason for this is uneven tension on the two sheds that make the complete weave, one assisting the beating-up more than the other. If the inquirer will find which shed is tighter, due to the harness lifting higher, and will make the proper adjustment of his harness straps, the picks will go in evenly. This same tendency is present in heavier picked goods, but is not so apparent owing to the smaller space between picks. On the heavier goods the lower shed need simply be adjusted in relation to the race plate, but on sleazy fabrics, considerable skill is required to have the shed suitable for the passage of the shuttle and at the same time give equal tension on each pick.

Use of Soluble Antimony Compounds

Quite a number of references have recently appeared in the chemical literature dealing with the use of soluble antimony compounds, such as sodium antimony sulphate, sodium antimony fluoride, the double salt sodium fluoride, antimony sulphate, etc.; all being substitutes for more expensive antimony salts formerly used as mordanting materials, such as antimony lactate and tartar emetic. None of these compounds, however, are quoted in current chemical price lists, which leaves us in some doubt as to whether or not there is actually any extended use of these antimony compounds in dyeing. Any information which you can give us bearing upon this matter, indicating the extent of the market for soluble antimony compounds, and where the market exists, will be very gratefully appreciated. (3464)

Regarding the use of certain soluble antimony compounds to replace tartar emetic, we may say that one of the largest dye makers in the country in sending out formulas uses the expression "tartar emetic or antimony salts." We presume this latter refers to the compounds referred to by you, and the general impression is, so far as we are able to find out, that there would be no objection, though apparently no special advantage, to their being used as substitutes for tartar emetic. This latter salt, tartar emetic, is used in the mordanting of cotton yarns for basic colors, and finds similar use in the cotton print goods. In getting results from both these branches of the dyeing industry, the compound best known has, of course, the right of way, even though a substitute may be cheaper and even give better results. For some months past the use of bright colors for civilian purposes has been at a minimum, but there is every reason to believe that, now the war is over, greater attention will be paid to the production of these colors on fabrics intended for civilian use.

Care of Rollers in Worsted Spinning

We are spinning worsted to low counts such as 2-5s and 2-7s, and have more trouble than we ought to have with bad rollers. We use an 18 dram roving to push the work through, and allow one inch over length of staple. (3413)

The ratch may be lowered to advantage, especially if the roving is moderately hard twisted. Try 2 inches over the longest staple, even if an extra set of carriers has to be used, or put less twist in the roving. See that the traverse motion

is kept in proper working order. Being out of sight, this is somewhat neglected. Put no more weight on the front roller springs than is required for getting an even thread.

Broken Bobbins in Wool Spinning

The number of broken or split bobbins in our spinning department has lately assumed serious proportions. The quality of the bobbins seems to have suffered no reduction but their life certainly has. Can you make any suggestions as to what may be the trouble?
(3412)

There is a considerable loss in some spinning departments from broken and split bobbins, especially where packings are used on spindles. As the hole or bore becomes larger by usage, and where it is necessary to add new bobbins from time to time, the general custom is to have the packings on the spindles fit the bobbins with the largest size holes. This results in splitting the ones with the smaller holes by driving down on the tight packing. The bottom of the bobbins also is chipped off on being raised with a stick when the packings are too tight.

It is common among spinners to insert waste in the loose bobbins to make them fit tight on the spindles, resulting almost invariably in the bobbin being split when driven on the spindles again. Defective bobbins are productive of waste and imperfect yarn in spinning. These conditions are overcome and a considerable reduction of waste in spinning realized by the use of bobbin holders; an increase in production and quality of yarn also results. To prolong the life of bobbins and provide a smooth surface for the yarn during spinning they should be enameled. This also prevents them from becoming oil soaked and they will resist the effects of steaming.

Measurements for Worsted Half Hose

We are standardizing our worsted half hose, and wish to make sizes to conform to the regulation. Will you advise us the size in inches of cuff, also leg length, and if they are measured from center of gusset or to the end of stocking.
(3432)

The enquirer does not state whether coarse or fine goods are being made. Goods weighing up to 2 pounds should be made on $3\frac{3}{4}$ inch cylinders from size $10\frac{1}{2}$ up. Cylinders of $3\frac{1}{2}$ inch diameter are more suitable for sizes $9\frac{1}{2}$ and 10. The

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cuff should be $5\frac{1}{2}$ inches in length on a finished half hose. The forms on which the stockings are dried should stretch the width of goods very little, if any, and should be from $\frac{1}{2}$ inch to $\frac{5}{8}$ inch longer than the size desired finished. The forms for size $10\frac{1}{2}$ stockings should be from 11 inches to $11\frac{1}{8}$ inches long, measured as shown in the accompanying drawing. The leg should be long enough so that when the stocking is folded at the line indicated by the figure 1 the two parts indicated by the figure 2 should meet. Or when folded, the looping course at the toe should meet where the cuff and leg join. The proper method of measuring the length of foot is shown in the drawing by the line running from the point of the toe to the heel and touching the highest point on the sole.



METHOD OF MEASURING HOSIERY

Starting a Small Hosiery Mill

With an associate I am considering starting a small hosiery mill of about 20 knitting machines. Would it have any chance for success, considering the competition of much larger establishments? How many loopers and ribbers would be required? The product would be men's half hose of the best quality possible. What equipment would be necessary for the dyeing and finishing, considering the latest and best methods and machines?

(3410)

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The success of a plant depends more on the ability of the manager than on the size of the plant. If the manager has the ability to organize, he will soon find ways and means of enlarging the business. In the writer's estimation, the following are the most important points in starting a plant of this kind:

First. A good practical man who knows the proper equipment to install; knows how the goods must be made, and insists on the goods being the best of their kind on the market.

Second. It will be necessary to know the exact cost of the goods to enable the setting of a selling price which will allow a satisfactory margin of profit.

Third. The proper merchandising of the product. If the product itself is first-class, it should be possible to get the highest market price for it. It will be found that the merchandising of the product will be the most important thing in the success of the little plant, and this cannot be done efficiently unless the product itself is right. These requirements must both be met and, as stated before, under normal conditions a man with ability to organize should have no trouble in making such a plant pay and gradually increase it as he finds it necessary or advisable.

The following list gives the equipment necessary for a mill of the size mentioned:

- 20 Knitting machines.
- 5 Ribbers for rib tops.
- 4 Loopers.
- 1 5-horse-power motor.
- 4 Open vats of 100 lbs. capacity.
- 12 Trucks for handling work.
- 1 Washer or laundry machine.
- 24 Steam forms.
- 1 Hydro-extractor.
- 1 Hot press.
- 1 Ticketing machine.
- 1 Stamping iron for transfers.

It would require five ribbers to knit enough rib tops for twenty machines, as each knitting machine should produce 5 dozen pairs per day, and each ribber will produce about 20 dozen ribs per day.

The number of dozens that can be produced upon a looper depends more upon the operator than upon the machine. A first class operator can produce from 35 to 40 dozen per day, but as looping is the most difficult operation in the manufacture of hosiery, it requires several months for an operator to

become efficient. For this reason it would be necessary to install at least four loopers.

It would require 4 open vats of 100 pounds capacity for dyeing and bleaching, 1 vat for dark shades, 1 for light shades, 1 for bleaching, 1 for stock liquor, and 1 laundry machine for finishing. In a plant of larger capacity we would recommend machines for dyeing. But inasmuch as these machines are more expensive, take considerable power, and as the largest advantage in machine dyeing is the cutting down of labor cost, whereas one man could easily dye the entire product, whether it were dyed in open vats or machines, we would install the open vats and replace same with machines as the plant increased its capacity.

Dyes and Methods for Coloring Cotton Piece Goods

I wish to obtain some correct information as to the most adequate and even dyeing methods of dyeing piece goods (cotton) with vat colors, sulphur colors, directs, and basics on jigs. I am particularly anxious to know if vat colors can be successfully dyed on the jig in the regular manner, or whether it is necessary to pad this or dye it in the slop or submerged jig. I would like to get some suggestions as to running cotton piece goods in light, medium and heavy shades, and would like to get the most practical methods of doing this. (3444)

Jig dyeing with the several classes of colors indicated in this inquiry is quite possible, and as a matter of fact all are dyed by this method. The simplest class of dyes to apply by jig dyeing is the group of direct dyes. This class is generally dyed in a solution of the dye according to shade desired with the aid of soda ash and Glauber's salt, heating the bath to about 140° F. for light shades, and to the boil for heavy shades, giving the goods two or more passages, according to the depth of shade desired. Direct dyes that are to be diazotized and developed are not generally dyed in jigs, but are dyed in continuous machines.

The sulphur colors are quite commonly dyed in jigs. Some of the dyes of this group require the use of a special skying or oxidizing frame to be erected between two jigs, so that the action of the atmosphere may be made use of to oxidize the dye on the cloth while on its passage from one dyeing jig to the other. Blacks, dark blues, dark greens, and other heavy

shades are best jig dyed, while light shades of the sulphur colors are more conveniently dyed in padding machines. However, light shades are frequently jig dyed, and with excellent results. The make-up of the sulphur color bath for jig work will depend upon the particular sulphur color used, and this data must be ascertained by trials before actual work on the jig is commenced.

Basic colors are not usually dyed upon jigs. The reason for this is that the preparatory mordanting of the pieces is not very successfully accomplished, and as a consequence the uniformity and evenness of the resulting shades are likely to be defective. With this class of dyes, penetration is also very imperfect. It is advisable not to consider dyeing these dyes upon jigs.

The vat colors are readily dyed upon jigs. The usual skying arrangement is essential for good work, and, in the case of goods that are difficult to penetrate, the jig should be of such pattern that the rollers are completely submerged. The squeezing rollers, also, should receive attention, so that the distribution of the dye liquor throughout the length and width of the piece is absolutely equal. The vat dyes vary so much in their properties that it is necessary that the dyer should have full particulars as to the exact quantities of chemicals that go to make up the bath before he begins work.

The main point regarding jig dyeing is to have the goods properly prepared for dyeing. They should be well boiled-out in the kier, and completely freed from all sizing. For very light shades, or shades that are to be clear, the goods should be bleached.

In dyeing light shades, the bath may be run off after the pieces are dyed, while for medium shades and, of course, heavy shades, the bath is to be replenished with additional quantities of dye and other chemicals, for proceeding with the dyeing of subsequent lots.

If this correspondent desires to engage in jig dyeing, it will be well for him to experiment beforehand on a small scale and gain some experience. If he is a dyer by trade, of course this experience will come to him more readily than if he has no dyeing experience. Perhaps it will be best for him to engage the services of an experienced jig dyer, since jig dyeing is really a distinct branch of cotton goods manufacturing.

As to working details, these will have to depend upon the class of cotton fabrics to be dyed, and also upon the kind of

service expected from the goods in actual use. This data will determine the particular kind of dye to be used. Working details for each class of dye may be obtained from the dye manufacturers, and which they will be pleased to give upon request.

Detecting Chlorine in Bleached Cotton Fabric

Kindly send us the formula of the liquid used in testing bleached fabric to detect the presence of chlorine. (3299)

The solution usually used for testing cotton cloth that has been bleached, for the purpose of detecting the presence of chlorine, is made with the aid of starch and a little iodide of potassium. A small amount of starch (a few grains) is worked into a thin paste with a little water and this is then poured into about twenty times its volume of boiling water. The starch apparently dissolves, but as a matter of fact the starch grains only break up. The resulting solution should be nearly clear. To this solution add a few grains of potassium iodide which dissolves immediately. The solution is then ready for use. A drop placed on a fabric that carries active chlorine shows at once a blue coloration.

A better method of making this test is to use "iodide of starch paper." This paper is made with pure filter paper that has been saturated with a solution of starch and iodide of potassium that has been made as above directed, and then allowed to dry. This paper keeps for a long time, while the solution does not. To make use of this starch paper, a small slip of it is moistened with pure water and applied to the cloth, and should there be traces of chlorine, the paper will become tinged blue.

Yarn for Heavy Silk Jersey

I am about to experiment on a heavy Jersey silk like the enclosed sample. Can you tell me whether cloth is dyed in the piece or skein. I shall greatly appreciate this information, as well as any other particulars you can give me in connection with this subject. (3457)

There is no doubt that the yarn is first dyed in the skein before knitting. As the work is first to be experimental, we would not advise any great layout of money until the procedure was thoroughly understood. A common fault when a man wants to introduce a new line is to at once buy all that

is recommended, often by people who do not know all the conditions.

If care is taken, and the early stages of the work carefully studied before putting the operation on a commercial scale, although a little more time is required, you will be repaid for your trouble by a better understanding of just what will be required for your particular need.

Sizes of Knit Gloves

Can you give us the standard sizes for knit gloves? (3427)

We have never seen any standard scale of sizes for knit gloves. There is a variation in the sizes of these goods as made by different manufacturers. The fingers of some lines are a trifle longer than others. The kid glove manufacturers have a regular standard of sizes, but the knit glove manufacturers make different sizes which they stamp to suit their fancy. One knit goods manufacturer may call his three sizes 7, 8 and 9, while another manufacturer may call the same sizes 6, 7 and 8.

Effect of Hard Water on Bleached Mercerized Yarn

We are confronted at the present time with considerable trouble regarding the bleached mercerized yarn which we are converting into threads and trimmings. The yarn is wound on cones and is of very good quality and strength; but upon being unwound from the cones, the thread sticks to the surface of the cones and forms a tension. This tension causes the thread to break in passing through the needle of a sewing machine or a shell machine. The thread in question has been condemned on this account. We have gone into the matter quite deeply and we are of the opinion that the trouble is in the bleaching, where an insoluble lime compound is formed with the fatty acid of the cotton fiber. If the water used in bleaching contains any quantity of lime, this insoluble lime salt will be formed in the first operation known as the kier boil, and considerable difficulty is experienced in removing it.

The characteristics of these insoluble lime salts are that they are very sticky and absorb moisture. This fact is proven to us in this way: We find in damp weather that it is almost impossible to run the yarn off the cones without breaking it. When the humidity in the air is normal, the yarn seems to run off the cones better, but there is the same trouble involved

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which makes the thread impossible to run. Could you give us some information in regard to treating the thread in some way so as to remove the tendency to stick to the cones? This would have to be a finishing process which would have to be applied after the goods are bleached, for it is only on our bleached work that we are having any trouble.

For your information, we do not bleach our goods here in this plant but are having them bleached by a concern in Philadelphia and by one or two other concerns in the East. We have heard of a process where paraffin wax is used, but we are not quite sure it would prove satisfactory in our case. We expect to open a bleachery of our own here about January 1, and we think we will be able to do away entirely with this situation by removing the hardness in the water before the bleaching operation. We will certainly appreciate some information from you regarding this, as it is a situation that is critical with us at the present time. (3434)

In the first place, paraffin wax should not be used, as the results will by no means be satisfactory, and it would only complicate matters by increasing the difficulty already experienced.

There is no doubt that the trouble is due to lime soaps formed in the fiber. There are three possibilities by which this can be caused: by hard water being used in the kier boils; by an incomplete kier boil; or by hard water being used in the bleaching. This can either be lime or magnesium hardness, or both. As stated in the inquiry, the difficulty is only found in the yarn which had been bleached, so we will treat this point and disregard the other two possible sources.

Of all processes used in the textile industry, bleaching is the most seriously affected by hard water; not only is the solvent action of the water lessened, but secondary reactions are set up which greatly deteriorate the proper action of chemicals and lead to a very unsatisfactory finished product. Not only is the fatty and waxy matter contained in the cotton affected, but also the protoplasmic constituents, rendering them so resistant that even a soda boil has little effect upon them. Great trouble is due to the absorption of these bodies of chlorine. Some time ago the writer experienced this difficulty and overcame it as follows:

The cones were placed in a suction dyeing or bleaching machine with an 8 per cent. solution of hydrochloric acid. After running for a short time, the acid was drawn off and warm denatured alcohol run through the cotton. This is rather an

expensive proceeding, but is practical in the case of an emergency. The conditions would be altogether different were it possible to re-process the lot. The cause should be removed, however, in future lots. It can be done at only a small expense, and may save the bleachery its future.

Sulphuric acid cannot be used in place of the hydrochloric acid, due to the formation of calcium sulphate, which remains in the yarn, giving it a harsh feel. It will also retain some of the fatty matter.

The calcium chloride, being soluble in the alcohol, is readily removed together with the fatty material, and leaves a soft yarn, free from the difficulty experienced.

Cleaning Raw Cotton in Woolen Mill

We are having a great deal of trouble in cleaning raw cotton in getting it free from motes and immature fibers, so we would like to know what kind of a machine to install to eliminate this difficulty. (3441)

A wool carder advises running the cotton in a thoroughly dry state once through a dusting or willowing machine; then, if necessary, once through the first breaker wool card. The sort of cotton may not be adapted to be used in its natural shade, and in such case it should be used only in black.

Process for Bleaching Heavy Plush

What process of bleaching would you recommend for heavy plush like sample? Would the sulphur process give good results? (3419)

It would not be advisable to use sulphur on such heavy goods as the sample submitted, for the material would be carbonized before the bleach had done its work. The best process for bleaching this material is the peroxide bleach, for several reasons. In the first place, the goods are heavy. To get a good white they have to be thoroughly bottomed, otherwise the goods look poor and seem more like shoddy than a good heavy plush with some body in it. In the second place, it being a plush fabric, it is not wise to handle it too much or knock it about, as it is sure to beat out a lot of the material. Third the goods are so heavy that the process of bleaching will naturally take much longer and there is more risk of tendering. From this it will be seen that the process has to be proceeded with carefully and the bleaching cannot be done too quickly.

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or the outside would be burned and the heart of the goods would be gray.

With the peroxide process the liquor could be used at the right strength, the goods would be bleached uniformly and thoroughly bottomed, and would be a good uniform color. On the other hand, if a sulphur process were used the goods would have to be in the process so long that the risk of carbonizing the material would be very great.

Distinguishing Wool Qualities and Yarn Counts

How can I tell a $\frac{1}{2}$ blood worsted yarn from a $\frac{1}{4}$ blood yarn; also a 12s from an 8s yarn when in the skein? How can I tell whether they are $\frac{1}{2}$ blood or $\frac{1}{4}$ blood, or 12s or 8s?
(3437)

In answering your inquiry it will be necessary to distinguish between wool qualities and yarn counts. You can only learn to judge wool qualities by actual experience, and no amount of printed information would be of much assistance. The general principle is that fine qualities of wool fiber spin into the higher counts. The first difference then between a half-blood yarn and a quarter-blood yarn would be in the counts. The practical limit for counts spun from quarter-blood is about 32s, while a half-blood may be used for 50s. You can readily determine whether a yarn is 12s or 8s by weighing a definite length of each yarn. The number is the number of hanks of 560 yards in a pound. With 8s yarn, 8×560 , or 4,480 yards, weigh one pound. With 12s yarn, 12×560 , or 6,720 yards, weigh one pound. It is hardly practicable to reel off enough yarn to weigh one pound, so the calculation is usually made from shorter lengths which are weighed on grain scales. If you are handling yarns, a good book on calculations would prove useful, and we would recommend that you purchase a copy of "Yarn and Cloth Calculations," by Yates. This can be secured from our book department.

Testing Textile Materials

Is there any organization in the United States that makes a business of testing textile materials for manufacturers and buyers. As large purchasers of textiles of all kinds, we frequently need the opinion of experts on the content and processes employed in the manufacture of goods.
(3428)

The United States Conditioning and Testing Co., 340 Hudson Street, New York, the Textile Research Company, 34

Batterymarch Street, Boston, the various textile schools, and the National Bureau of Standards, Washington, all make tests on textile materials. A publication has just been issued by the National Bureau of Standards under the title of "Circular of the Bureau of Standards, No. 41 (3rd Edition)," which shows the character of work which the Bureau is prepared to undertake in its textile department, and gives a list of the fees charged. We would suggest that the inquirer write for a copy of this circular.

Arrangement of Machinery in a Bathing Suit Mill

We manufacture bathing suits and have difficulty with work accumulating ahead of some of the workers. Can you offer any advice regarding the arrangement and number of machines?
(3426)

Arrangements should be made so that the operators will not have to leave their machines unnecessarily, and also so that the work will go through the mill without any interruption. The following arrangement of machines should be carried out whenever possible: 1, seamers; 2, overseamers; 3, hemmers; 4, trimmers and menders. There will have to be enough machines to balance the output; for every three seamers there should be one overseamer and one hemmer, and so on in proportion. It has been found by experience that this number of machines will keep the output running steadily along without accumulation ahead of any one operator.

It is a good plan to build a table at the end or very near the sewing machines to accommodate the trimmers and menders. The number of trimmers and menders also depends on the number of machines and should be worked with the same idea of keeping the work progressing. Where the knitting machines are in fair condition and where shoddy stock is not used, have for every three seamers one overseamer and one hemmer, two trimmers and one mender. This will balance the work very well and cause no delay in finishing.

In small mills the menders can inspect, but this is not advisable where the output is more than ten dozen per day. Wherever possible it is advisable to have inspectors look the garment over after it is finished and before it is pressed. For the position as inspector it has been found that the best results are obtained by having a middle-aged woman and not a young girl, as the latter is inclined to be partial and have favorites among the operators.

Quantity of Sulphuric Acid in Bleaching

Would like you to advise us the correct amount of sulphuric acid to use in one hundred pounds of goods as an anti-chlorine in bleaching cotton underwear fabric. Kindly advise in terms of quarts or gallons, and also state the percentage. (3447)

After bleaching with chloride of lime solution, it is necessary to "sour" with an acid to remove the last traces of the bleach liquor, and to complete the bleaching process. The acid most commonly employed is oil of vitrol. As a rule, the strength of this acid is such, in the diluted form in which it is used, as to stand at about 1° Tw., and which corresponds to three and one-half quarts of commercial oil of vitriol to every one hundred gallons of water employed for the souring bath.

No direct rule can be given for the amount of vitriol to be used based upon the strength of the bleach liquor. After the goods are removed from the bleach, they should be washed to remove the excess of bleaching liquor, and then put through the sour. From the above it will be seen that the amount of acid to be used depends upon the volume of the "sour" bath, and in turn, this volume depends upon the amount of material to be handled. It might be well to base one's figures upon a sour bath allowing three gallons of the latter to each one pound of goods; or, for 100 pounds of goods there will be required about $2\frac{1}{2}$ gallons of oil of vitriol. This is not a hard and fast figure for the quantity of goods named, but is a fair average, since the practice of bleachers varies on this point considerably.

Weighting Silk Hosiery

We understand there is a method of weighting silk hosiery after the goods are dyed. We have been informed that sulphate of zinc is sometimes used, as well as a good grade of carpenter's glue. We find that our goods are inclined to be fuzzy and would like to overcome this defect without injuring the fabric, if that is possible. We are enclosing a sample of half hose, showing the goods as they are made in the gum. Of course, after these goods are boiled off they present a different appearance. (3430)

The weighting of silk hose after dyeing is a matter of very considerable difficulty if the intention is to impart permanent weight without impairing either the shade as dyed or the strength and wearing qualities. Weighting trials made on stan-

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dard shades dyed with the classes of colors usual for silk dyeing and which resist the general domestic laundering completely, fail to give a degree of permanent weighting that is at all satisfactory.

Zinc sulphate is made use of to impart false weight, but other chemical salts are also used; for instance, Epsom salts (sulphate of magnesia), barium chloride and calcium chloride. This latter salt is objectionable inasmuch as it is excessively hygroscopic, absorbing considerable quantities of moisture from the atmosphere, and, where used, generally imparts to the goods a "soggy" feel that is commercially undesirable. The better substance to use is Epsom salts, which is not hygroscopic and besides has no serious influence on the goods. It should be remembered, however, that where the boil-off in the silk is, say, 25 percent., i. e., 100 pounds of the silk losing 25 pounds of gum, it is not to be expected that any "weighting" treatment after dyeing will enable the manufacturer to restore the 25 pounds loss by the aid of dissolved chemicals.

The following weighting bath has been used and by it the weight of the treated goods has been increased up to 14 percent.:

Prepare a bath with the following ingredients:

300 gals. water, in which is dissolved
225 lbs. Epsom salts, and
30 lbs. canary dextrine, then add
 $\frac{1}{2}$ gal. glycerine, and mix thoroughly.

The silk hose are saturated with this solution by working them in a rotary machine, allowed to drain, hydro-extracted, boarded and dried.

Certain bright shades on this class of hose, such as bright greens, reds, blues, etc., should be worked in the solution only after preliminary trials made with a single stocking before the addition of the glycerine, as this substance is very liable to strip wholly or partially the "topping dyes" used to give the particular degree of brightness, especially when the basic dyes have been used for that purpose.

No method of weighting that is adopted to give false weight can be regarded in a favorable light, especially from the viewpoint of the customer, unless the goods sold are branded as having been artificially augmented in weight by substances that are not real silk or that partake of the properties of silk. It is a peculiar commercial custom that permits goods to be

sold that carry mineral substances that will be removed almost completely during immersion in the wash tub.

Regarding the use of the "best grade of carpenter's glue" as a weighting agent; the writer is of the opinion that the amount required to restore the original loss in the silk due to the boil-off would be so great that the hose would feel like wire rather than silk.

Refined gelatine, the transparent kind, sold in thin sheets, is much used as a dressing for silk to overcome fuzziness, and is generally applied in a very thin solution, but it is not used for weighting as ordinarily understood.

Mixing Cotton Waste in Knitting Yarn

We are having trouble with knit waste torn up in a picker not mixing uniformly. We are spinning 10s knitting yarn, using 25 per cent. of the waste with 75 per cent. of new cotton. Is there some method that will put the waste in better condition to work? We enclose samples of the waste and yarn produced. (3424)

In working waste with good cotton it is best to make as large a mixing as possible, say enough to last two or more days' run, and let this stand for some time in damp air before using. In this way the whole mass seems to work better and get in a more homogeneous condition. The fact remains, though, that unless the waste is torn up thoroughly before being put in the mixing, the mixture will not feed regularly in the hoppers.

The sample of waste examined shows a large percentage of short fibers and a good many unbroken strings, too many it seems. Try to get this waste more thoroughly broken up, if possible, before using it. If the mixing is done by hand, it is best to see that it is done thoroughly, that is, the waste distributed evenly. If this is not carefully done, difficulties will arise.

First make a solid waste lap on the first breaker, running one waste lap on the intermediate picker and three laps of new cotton. Be careful to make the same lap out of the waste cotton as is made out of the new cotton. Waste cotton, after it has been run through a waste picker and put into an automatic feed, will feed much heavier than raw cotton. It will be necessary to reduce the speed of the spiked lifting apron about one tooth on the sprocket gear, or reduce the feed pulley

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about one inch in order to get the same weight of lap out of the waste that is obtained from the new cotton. This will give a correct mixing of 25 per cent. waste.

If the waste is run through the picker twice instead of once, it will be in a better condition, and will mix more thoroughly.

Tinting Cotton Hosiery

Will you be so kind as to favor us with particulars as to the methods employed in securing a light yellow cast to cotton hosiery in order to make its appearance closely resemble natural cashmere? (3394)

Imparting a light yellow cast to cotton hosiery is usually done by dyeing the cotton with a cotton orange or with a very yellow shade of cotton brown. There are so many dyes that meet this requirement that it is difficult to enumerate them. They are of the substantive group, and do not require any great amount of skill to apply them. It would be best for this correspondent to send a small sample of the shade he wishes to imitate, together with some of his goods, to one or more of the dyestuff houses, and let them take the matter up in their laboratories.

Another correspondent replies to the question as follows: On account of the extremely light tint required it has never been found practical to use direct cotton dyes for tinting white cotton to make it resemble Egyptian cotton. It is possible to use a dilute solution of Bismark brown, which, when dyed, the mordant gives the light tint of about the right shade. The usual method, therefore, is to use the vegetable extract, the best being chicory (coffee essence). The simple decoction of this material will give the tint, which is quite permanent, even, and fast to light.

Wool Underwear Finishing Problems

We are much troubled with high-class wool underwear for men and women shrinking after the garments have been put through the unshrinkable process. Also the goods often finish hard to the touch after they have been treated. Can you say how these matters can be remedied? (3429)

When the shrinking process has been correctly performed, there should be no further shrinkage in washing, but the baths for these operations are used for so many lots of goods that the worker does not always succeed in maintaining the correct

strength. In some cases the goods are passed for a second time into the treating baths further to shrink the goods, but this is apt to injure the fiber and make it harsh.

The writer is acquainted with several manufacturers who have very little trouble in this respect. After the goods have been passed through the unshrinkable baths, they subject them to a second fulling for a short time at a higher temperature than the first, which serves to take up the latent felting power in the wool and prevents further shrinkage when the goods are in the hands of the customer. The temperature is raised in this case because there are some classes of yarns which do not felt until a certain temperature is reached, when there is appreciable contraction.

Subsequent shrinkage in the wash tub is often the result of careless laundering, the worker thinking to perform the work more quickly in a high temperature. By the process just mentioned, the manufacturer can anticipate such drastic treatment of the goods and reduce the shrinkage due to this cause. It should be pointed out that where this is done it is advisable for the manufacturer to make a somewhat greater allowance for contraction, and thus he is able to insure that the second fulling operation does not diminish the sizes.

In regard to the second part of the question, the hardness may be traced to various causes. The usual way is to assume that the goods have been too harshly treated in the unshrinkable process, that the proportion of chemicals has been too high and that the wool fiber has been attacked to its detriment. If this is really the cause, the worker should get into the habit of handling the goods when they are undergoing treatment in the unshrinkable bath, and with a little experience he will be able to detect the right kind of "slimy" feeling, which denotes that the operation has been sufficiently conducted and that the garments should be removed. But this is by no means the only cause of hardness, although the average man who has not given the matter his study will most always put this down as the solution of the phenomenon.

It more often happens that the operation of rendering unshrinkable has been quite correctly and adequately carried out, but that the proper means have not been taken to have the action of the chemicals neutralized. If the goods be boarded and dried in this condition, they invariably finish hard; in fact, the writer has seen some garments which were so rigid that they could almost stand alone. To remedy this, the garments

should be put back again into a bath containing a percentage of carbonate of soda, or pure alkali, which will have the effect of neutralizing the acid's effect.

The goods should next be placed for a short time in the scouring machine further to neutralize any chemical agents, after which they can be boarded out. When dry the garments will be soft and possess the handle desired. Every worker in a knit goods finishing department should be shown how to test the goods by the use of litmus, for it is always the most accurate test. Many test them by handle alone; if acid is present the handle is somewhat harsh to the touch, while the alkali gives a much softer feel.

Large quantities of goods are spoiled each year in the finishing rooms of knit goods manufacturers from ignorance as to how to correct goods which have an acid character. These are often put down as waste when they could again be restored by careful neutralizing with an alkali. If the goods are given a second fulling after the unshrinkable process has been performed, they seldom finish hard. Of course, the hardness is permanent if the treating bath has been too strong, but this can generally be recognized in the case of white goods by the distinctly yellow tint taken on by the goods.

Draft of Noble Comb

I would like to know the factors involved in determining the draft of a Noble comb. Can you refer me to any calculations on this question? (3423)

The draft of a comb is found by calculating or measuring the length delivered by the drawing-off rollers in a given time, and dividing this by the length of sliver fed through the conductor boxes during the same period. The points concerned are:

1. The total elongation as between the combined total thickness of the slivers fed up, and the thickness of the combed sliver delivered.
2. The slight surface lead between the small and large circle.
3. The drafting and combing by the outside drawing-off rollers.
4. The drafting between the outside and inside drawing-off rollers.
5. The slight elongation or lead between the inside drawing-off rollers and the coiler-can rollers.

Humidification of Saw-tooth Weave Shed for Narrow Fabrics

Will you kindly give me any advice you may have as to the need of humidifiers in a saw-tooth weave shed for weaving narrow fabrics? I know it is customary to have a humidifying system in cotton cloth weave sheds, but is it necessary in a shed for weaving narrow fabrics? (3337)

The need of a humidifier equipment in a saw-tooth weave shed for weaving narrow fabrics, or any other textile product, is just as great as it is for any other structure. The type of construction does not in any case eliminate the desirability of having uniform relative humidity and the necessity of suitable humidification equipment to provide humidity. The only manner in which various types of construction have a direct bearing on the humidifying equipment is in determining the size of such equipment. A sawtooth structure has, for obvious reasons, a decided advantage in reducing the size of equipment needed, especially if it has good ceiling height and the humidifying equipment is well designed.

We believe that the necessity for installing suitable humidifying equipment in a saw-tooth weave shed for weaving narrow fabrics is of even more importance than if wide fabrics of most kinds are being woven, since uniformity in width and strength are of more importance, and these are in great measure dependent upon uniformity in atmospheric conditions.

Air Stains and Their Removal

Enclosed find a sample of our bleached knit cloth showing several stains. Our bleaching is done in an open tub and we use equal parts caustic soda and concentrated soda ash. We use a bleaching powder for bleaching. Can you suggest a remedy for this difficulty? (3316)

The stains in the sample of knit goods are air stains. These are caused by leaving the goods too long in the wet state in a heated room or by bleaching in an open tub with the goods rising above the liquor in the kier. If the latter, the goods will have to be bleached again, as the stain produced in this manner is harder to get rid of than an ordinary air stain.

The inquirer will realize what is meant if he watches the open kier boiling and sees the goods swell up. As the boiling progresses the liquor disappears, leaving the goods exposed in places and the scum or dirty water just reaches a certain point,

thus producing a stain similar to that on the sample submitted. This is what is called a kier stain. The best method is to weight the kier before starting to boil the goods. First cover the goods with burlap or clean sacking, laying on weights to keep the burlap down. Sometimes heavy iron rods well wrapped up in burlap are used. If the goods are left to lie in the wet state too long in a heated room, the goods that hang over the side will dry and that part containing moisture will be stained as in the sample.

These stains can be removed by sprinkling them with boiling water, and letting the goods lie for about twenty minutes. The only way to prevent them is to keep the goods well covered and not let them lie around in the wet state. It is not necessary to make any change in the handling of the goods except as mentioned above.

Nibs in Knitting Yarn

Enclosed please find samples of knit goods and roving. I am troubled with nibs. Will you kindly offer me some suggestions as to how to avoid them? I am using the following stock mixture:

	Pounds
Fine New Zealand Wool.....	30
Wool Shoddy	18
Cotton Shoddy	22
China Cotton	30
Total	100

The wool and cotton shoddy will average 60 per cent. cotton and the cotton shoddy is very nibby to commence with. The wool is from 4 to 9 inches long. Do you think the wool is too long to mix with so much shoddy? I mix the wool and shoddy together before putting the emulsion on; put through the picker once, then mix the cotton. My cards are set to 33 gauge on the second breaker and finisher. The finisher runs 74 r.p.m., workers 8 r.p.m., and ring doffers 18 r.p.m. I have tried everything I can think of but I don't think I can take the nibs out when they are in the shoddy. I hope you can give me some enlightenment on this matter.

Kindly give me your opinion of the enclosed samples. You will notice one is flat goods and the other ribbed. The emulsion I am using is half lard oil and half water, 8 quarts per 100 pounds.

(3354)

On careful examination of the sample of roving there appear some cotton nibs, but it is almost impossible to entirely

card out all the little hard pinhead nibs where cotton shoddy is used as an ingredient. The chief trouble appears to lie in the shoddy and waste not being thoroughly carded out; this material appears more or less matted or felted and not properly opened or straightened out, which would cause nibs or uneven roving.

The wool in the stock mixture is of a fine soft quality and does not appear too long to mix with the shoddy when handled under favorable conditions. The matted condition may be caused by the use of too much oil, or by oiling the cotton along with the wool. Judging from the appearance of the stock, it seems advisable to use less oil and more water in preparing the emulsion. Do not allow the oil to come in direct contact with the cotton; this can be avoided by oiling the wool ingredients, then run through the mixing picker, and afterwards bed down with the cotton. Too much oil will cause the cotton to mat, roll up and beat into the cylinder, thus preventing the fancy from keeping the cylinder clear.

Then, again, nibs and uneven work can be caused by the fancy not working properly, however good the quality of the stock. The way to determine whether the fancy is raising the stock properly is to stop the feed and allow the cards to run awhile. If the stock remains in the card and shows on the workers longer than a reasonable time after the feed is thrown out, it is a good indication that the fancy is at fault, and is not clearing the cylinder properly.

There are various causes that might prevent the fancy from doing its work properly on this class of stock which might not cause any noticeable bother on other classes of work. The fancy wire may be too fine and too close set; a 26-30 straight tooth open set fancy not wound on too tightly should give good results; set it into the cylinder hard enough to raise the stock, and run at a speed sufficient to clear the cylinder. The points on the fancy should go from 18 to 20 per cent. faster than the points on the cylinder; however, under some conditions it is necessary to vary the speed to best accommodate the work in hand, as an open set straight tooth fancy might throw too much stock if run too fast. The proper adjustment can be determined by experimenting.

To realize the best results the cards should be clothed with rather fine wire, say No. 34 wire on first and second breaker, No. 35 wire on finisher. All cylinders from the largest to the smallest must be as near perfectly true as possible in order to

prevent striking where it is desired to set close. As the enquirer mentions the fact that he is setting with a No. 33 gauge he, no doubt, realizes the importance of this point. On the size yarn in question it does not seem necessary to have to set down so close if the fancy is working properly, the clothing sharp and smooth, and the stock properly prepared.

As a means of more thoroughly carding out nibby stock, the worker belt may be crossed on the finisher card, which reverses the direction of the workers; also use the same method on the angle stripper.

The sample of roving does not show the amount of unevenness that is noticeable in yarn taken from the knitted fabric, which might suggest a change in the draft of the yarn in spinning or in the condensing of the roving.

A carder replies to this question as follows: By holding the roving to the light, nibs can be plainly seen. I would advise cleaner carding or a finer card clothing wire. Even the cleaning of the cards more frequently would help.

Finishing Cloth to Match Sample

Please give me your opinion as to the possibility of getting the same nap on the larger piece of cloth that is on the smaller piece, both of which I enclose. (3383)

It is impossible to finish the larger sample so that it will match the other one, because the construction and material are entirely different. The smaller sample is made with a cotton warp, the filling consisting of a stock that gives a long lustrous nap when napped. The larger sample, on the other hand, is a fairly well-balanced fabric made with a woolen yarn for both warp and filling. The larger sample is woven with a straight twill, while the smaller sample is woven with a broken twill. Many manufacturers make the mistake of expecting finishers and finishing machines to accomplish the impossible. If the finish on the smaller sample is to be matched, it will be necessary to construct the fabric in the same way and from the same kind of stock.

Strength of Jute Yarns

We have recently received a lot of jute yarn that is very irregular in size and varies considerably in breaking strength. Should there be this irregularity in strength? What should be the strength of various counts? Is there a table giving this information? (3358)

In consequence of the difficulties attending the spinning of jute fibers into yarn, the finished thread, except under special conditions, is probably as irregular in thickness as that of any other kind of single yarn. This being so, it is natural to find that the breaking strength of such yarns varies considerably, and in consequence, it is essential that a number of tests of each yarn should be taken if even a fair average breaking value is desired.

The actual breaking strain will vary according to the length submitted for testing, for it is obvious that the strength recorded is that of the weakest point in the yarn, and the longer the length tested the greater is the chance of such length containing a weak spot. Tables of breaking strengths of jute yarns were published in our issue of July, 1913, and copies have been sent the inquirer.

A rough value of the breaking weight of single jute yarns may be obtained by multiplying the counts by 0.75. This is, of course, only an approximation, for it must be remembered that the breaking weight is changed by the quality of the fiber, the number of turns per inch, and the efficiency of the preparing and spinning, as well as by other factors.

Dyeing Felts and Loose Fur

Will you kindly give me methods of dyeing union felts and all-wool felts, which insure thorough penetration. Also let me have, if you can, a method of dyeing rabbit fur in loose condition to insure even results without felting during dyeing.

(3347)

For dyeing union and all-wool felts where penetration is desired an ordinary open dyeing machine provided with a winch is generally used. For the unions, colors to be used must be selected having about the same relative solubility and which are slow dyeing; a much longer time is necessary in the dye bath for these goods, and the operation should commence at or about 100° F. Sufficient time should be allowed to insure penetration of the goods before the color is sprung by adding salt or giving more heat. It is simply a question of more time being allowed than for similar weight goods of the usual woven character.

The same principle holds good for all-wool felt; easily soluble, slow dyeing colors to be used and the addition of acid to spring the shade should be gradually made long before the

bath actually boils. Dyeing felts of any kind, and especially where penetration is necessary, requires that all traces of soap shall be removed from the goods by thorough washing before dyeing.

The dyeing of rabbit, or any other loose fur, should always be done in a pack machine. In such an apparatus the fur is held immovable while the dye liquor by means of a rotary pump is circulated through the mass of material. By this means the fur is dyed an even shade, and under the circumstances there is little tendency to felt. After washing, the material is removed from the machine in a free and lofty condition.

Experimental Cotton Finishing

What method is followed by cotton goods finishers and bleachers in finishing short lengths of cloth in order to test the possibilities of different finishes upon various fabrics before putting the goods through the works? (3355)

The regular way of testing the effect of different finishes upon various fabrics is to sew the lengths together and put them through the large machines; or to sew them to the ends of pieces passing through the process.

Waste in Carding Low Stock

Can you give any advice as to how excessive waste in wool carding can be overcome by better settings? We are running a rather low stock, but even for this quality the droppings are very large, and we would like to reduce them. (3418)

Low stock has a general tendency to make a large amount of waste in carding, consequently there is need of careful watching to detect and overcome conditions that are responsible. Excessive speed of the main cylinder is often responsible for unnecessary droppings, flyings and other sources of waste in carding. This is more likely to occur on a large cylinder than on a small one, owing to the increased surface speed of the larger diameter; also on short, coarse stock.

There are various makes of waste savers that go under the card which catch droppings and return them into the card. These are important factors in reducing waste in carding departments, when properly looked after and not set so close as to pick up dirt and foreign matter, which when forced back into the card makes its necessary to strip oftener. Besides,

this dirt is one of the worst elements to contend with in carding. Not only does it destroy the spinning qualities and increase the amount of waste in roping, but it is also responsible for specks and other defects in the finished cloth.

To prevent dropping of stock under the card, the working points of the cylinders and strippers should be clean and sharp, the leader-in, tumbler and fancies set in proper working order and run at proper speed. Owing to the many breaks in a sheet cylinder it is likely to drop a larger amount of short stock under the card than is the case with a fillet cylinder with a proper working fancy. These and similar methods aid toward standardizing waste in the carding department, to the extent that any excess over a set figure can be termed preventable waste.

Wavy Effect on Cotton Warp Cloaking

Under separate cover I am sending you a sample of a cotton warp cloaking showing a peculiar wavy effect, with streaks of light and shade running in the filling direction. I would like to know how this effect is produced. Is it caused by the irregular length of the nap, or produced in finishing? (3319)

The sample presents nothing out of the ordinary. It is a napped fabric and the wavy effect is produced by running the goods between calendar rolls, one of which is engraved so that the nap is pressed harder in some places than in others to produce the effect desired. This wavy effect disappears very quickly and the process is used only for very cheap goods.

Removing Kerosene from Fabrics

We are interested in the details of a method to remove kerosene from heavy fabric, such as drilling and heavy canvas, and would like to know how this can be done so effectually that all odor would be removed as well as oil. (3333)

If it is only ordinary kerosene that is on the fabrics, the most simple and the cheapest way to remove it is to pass the goods over a heated tenter frame, or pass them through a dry room. Possibly putting the goods over a set of heated cans will drive off all the kerosene. As to the odor, this may not be driven off at the same time as the main portion of the oil, and consequently a good airing may become necessary.

Kerosene and allied petroleum products being volatile even at ordinary temperatures, and more rapidly so at elevated temperatures, the problem becomes one of the proper application of heat to give the desired result. If the goods are only occasional lots, good results are to be had by stretching them on tenter frames in the open sunlight, where there is free access of air. This open air treatment will insure the complete removal of all traces of odor where other methods will fail.

Passing the goods through a steamer at low pressure will also remove the kerosene and perhaps all the odor.

Cotton and Wool Mixes for Underwear

We are using wool and cotton mixes for making heavy ribbed underwear and find that the cotton shows up in the finished cloth very nubby and we would like to know what is the best method of mixing wool and cotton. Should we use scoured wool with the cotton, or is it possible to use the wool in the grease? We also would like to know the best method of fulling and wet finishing this cloth. Should it be done in the cloth or in the garment? (3301)

If the wool is in the natural raw state it should be scoured before use, otherwise the grease and refuse will prevent it from being properly opened out in the working, and the machinery it passes through will be clogged up. The cotton you are using is evidently too short in staple, or the clothing on the carding machines may be too coarse. Fly cotton waste is useful for mixing with wool when smooth yarn is required. The card clothing should be fine enough, also sharp enough, to deal efficiently with the fine fibers of cotton. Nubby or lumpy yarn may be caused by the material having been carded in an excessively damp condition. Of course the cloth should be fullled and finished in the flat fabric as produced, rather than in the made up garments, as otherwise the same will shrink from the original shape.

Holes in Bleached Underwear

In the last few lots of underwear that we have bleached for a manufacturer he has found a number of small holes like those in the garment I am enclosing. Can you give us any information as to the cause of these holes? (3317)

After examing the holes it seems as if they were clean cut, but the small holes encircling the larger one denote a blow

hole which is made in the kier, caused by the goods not being packed solid enough. The liquor is blown through the soft places in the goods. We have also seen holes of this kind produced in goods by the caustic or soda ash not being thoroughly dissolved before running the liquor into the kier. Sometimes the powder will form into a solid lump. If this is run into the kier with the liquor it often causes holes in the goods. If a peroxide bleach is used the same thing will occur if the peroxide is not thoroughly dissolved. Holes may be made if the goods are exposed in the chemicing or scouring operations and get dry on the edges from the heat of the room.

A bleacher replies to this question as follows: As the holes seem to be clean cut, this would indicate that the goods had been caught in the extractor and nipped. The enquirer does not state whether an extractor is used or not, but I assume he is using one. In a bleachery where I was once employed there was an extractor basket made of wire. It did not look as if the material would get between the wires. However, we had some cuts almost similar to the one shown in the sample and finally located the cause in this extractor. When the extractor was filled up and set in motion the pressure of the goods forced the material between the wires and it caught on the stay that held the basket in place. To overcome this we put a piece of low quality burlap at the bottom of the extractor before entering the goods, and had no further trouble with holes.

Making Knotted Yarn

Can you give me any information as to how the enclosed sample of knotted yarn is made? Can it be made on a spinning frame or twister, and does the roll stop when the nub is being made? How can the knot be bound so the reed in the loom will not shift it? (3357)

This yarn is 2-ply and is made on a twister having two sets of rollers. One thread passes through each set of rollers, one of which is stopped at intervals. The yarn from the other set is delivered without interruption and forms a knot when the other set is stationary. The knot is sometimes fastened so that it will not slip in weaving by twisting a binding thread around the 2-ply, making a 3-ply yarn. If it is desired to use the 2-ply yarn, a coarse reed should be used in the loom and the yarn should be well sized so as to prevent the slipping of the bunches or knots as they pass through the reed.

Spots on Dyed Worsted Yarn

I am sending you a worsted skein which you will find full of undissolved dye particles. Can you tell me of an economical method for removing the undissolved particles without stripping the color? (3318)

This enquirer's difficulty proves the truth of the old saying to the effect that prevention is always better than cure. There is no economical method for removing the spots on wool yarn that are due to undissolved particles of dyestuffs. The color might be stripped from the yarn or reduced to such an extent that re-dyeing would cover the spots so that they would not show. Of course, it is not possible to remove the spots without removing some of the main color. The present instance is a good example of the necessity for dissolving the dyestuff completely in water and then passing it through a fine sieve before the goods or yarns are entered. This is the practice in many well-conducted dyehouses, and it should be more general, as the loss from damaged yarn is far greater than the time it takes to dissolve the dyestuff properly in the first place.

Building a Sulphur Bleach House

We would like to know what is the best type of sulphur bleach house. We have built two wooden structures for bleaching our wool underwear in the garment, but find that they soon fall to pieces. If you have not already published an article on this subject, possibly some of your correspondents can advise us. (3370)

A wooden sulphur house is never very satisfactory. Besides rapidly falling apart owing to the gradual corrosion of the nails used in its construction, the wood in a similar manner quickly yields to the acid vapors and in a short time repairs have to be made that cost more in proportion than the interest on an investment for a good structure. While sulphur houses are fortunately somewhat out of date, there are some concerns that seem to prefer to use them rather than to make use of more modern methods of bleaching.

The best and cheapest sulphur house is constructed of brick or concrete, painted inside when new and absolutely dry, with not less than two coats of good quality of asphalt paint or paint made from petroleum pitch, giving a new coat twice a year thereafter. Only by such care will the structure endure

The interior fittings, inside poles and hangers, being made of wood, will have to be replaced from time to time.

The house should have well made windows at each side and opposite each other to permit an unobstructed view inside, also two large doors at each end, and kept in place by means of wooden bars. The floor should be double, and the sulphur pan placed at one side and in a special opening to permit free access of air for a short time after the brimstone is lighted. The hip roof should have proper ventilators, and should be painted with the asphalt paint. The ventilators should be arranged so as to be opened and closed from the outside by chains or tarred ropes.

A good size for such a sulphur house is to give it a cross-section of about 144 sq. ft. (12 ft. wide, and an average height of 12 ft.) and 17 ft. 6 in. long, thereby giving to it a content of 2,500 cu. ft. Such a house will contain 500 cu. ft. of actual oxygen, the atmosphere consisting of $\frac{1}{5}$ oxygen and $\frac{4}{5}$ nitrogen, the latter being inert in the bleaching process. The 500 cu. ft. of oxygen weighs 17 lb. and requires exactly 17 lb. of brimstone to make 34 lb. of gaseous sulphurous acid (SO) all the structure will hold. In practical work, not more than 22 lb. of brimstone would be used, as any great excess is volatilized and later condensed as pure sulphur on the goods, from which it cannot be removed. Sulphur houses should be built on perfectly dry ground, and when not in actual operation, the doors, windows, and ventilators should be thrown wide open. To guard against fire, due to occasional spurting of the burning brimstone, the sulphur pan should be provided with a flagstone to rest upon, and a flagstone shield or baffle plate mounted some distance over the pan.

Clothing Napping Rollers

Which is the best method of clothing napping rollers; clothing the rollers dry with heavy tension on fillet, or first applying a coating of some sort of adhesive? If the second method is the better, how is the glue made and where can it be obtained?
(3359)

Both methods are used and both have their advocates, depending largely upon the character of goods to be napped. Clothed simply with heavy tension the teeth are more rigid and would be rather harsh on soft yarns. When using an adhesive substance, the clothing should be drawn tight, but so that the teeth will yield appreciably to back or side pressure

with the thumb, in other words, possessing a little elasticity. This method is preferable on soft yarns. When winding fillet a thin piece of steel from 1/32 to 1/16 in. thick should be kept between the coils of fillet on the top of the roll to be covered. This sheet of steel is shaped on one side to the contour of the roll, and this edge is kept in contact with the roll between the coils while winding clothing to insure uniformity of the space throughout the wind. This permits of a little spreading and settling of the clothing to a perfect surface.

Wool Sorting for Cassimeres

On our fine cassimeres, which form the largest output of our plant, we have lately been troubled by the occurrence of specks and an uneven yarn appearance. The carder and spinner have done their best to prevent the goods from showing up unsatisfactorily, and both roping and yarns seem to be all right. The enclosed sample will show just what I mean. Can you give any advice that may help us? (3322)

The average mill running on fine goods, usually makes from four to six sorts, and occasionally as many as eight sorts. It seems to be the growing tendency among manufacturers to do less sorting each year, the operation being considered slow and expensive. Whatever the number of sorts, if the stock is intended for fine or medium yarns, it is very important that the poorer qualities be carefully separated. Portions of the fleece that are inclined to be kempy, tender and undergrown, also cotted and felted portions, lumps, etc., have a tendency to prevent good blending of the stock, and this seems to be the trouble with the sample sent.

Stretching of All-Wool Sweaters

What are the properties of wool and the characteristics of yarn that cause high grade, all-wool sweaters to stretch when washed? We were under the impression until a recent experience, that wool goods always shrunk in washing. (3321)

The stretching of the garments in question may be explained as follows: The wool fiber is peculiarly elastic, and its elasticity is greatly increased as the humidity of the atmosphere increases. Wool normally contains about 18 per cent. of moisture, but has the property of absorbing very much more without becoming even damp to the "feel."

When wool is wet, it can therefore stretch considerably,

and when wet with hot water or hot soapy water, but without any other treatment, a permanent "set" or stretch is imparted to the goods, irrespective of the kind of yarn used.

The finer or higher grade the wool is, the greater the degree of elasticity it possesses in contradistinction to the coarser or more "hairy" wools which are low in elasticity. Dr. Bowman, in his valuable work, entitled "Structure of the Wool Fiber," gives a table which is the most accessible, covering the particular point raised.

The higher the grade of wool of which sweaters are made the greater care necessary in the washing of the garments so as to avoid as far as possible the tendency for the fabrics to stretch.

Felting, the opposite of stretching, is the result of working the goods in water at too high a temperature; or with too much soap or alkali. It causes the wool fibers to work closely together, the imbrications on adjacent fibers to interlock, thus occupying less space. The condition is merely cited to show the causes responsible for stretch and shrink respectively.

Yarns and Machines for Men's Socks

How can the following yarns be used to make men's socks in a B-5, Scott & Williams knitter, also with a ribber (Scott & Williams), 200 needles, $3\frac{1}{2}$ inch diameter: Number 18, 30, and 50, all singles. I mean which yarn for the ribbed top, which for the leg, etc.?

How many links in the chain of the ribber for each top (cut welt type)?

How many links in the chain of the footer for the usual length of the leg?

How many links in the chain of the footer for each of the following sizes: $8\frac{1}{2}$, 9, $9\frac{1}{2}$, 10, $10\frac{1}{2}$ and 11? (3335)

We would recommend using 18 singles in the ribber, 18 in the body, 30 and 18 in the heel and toe, 50 in the high-spliced heel and double sole. It is impossible to state definitely the number of links in the chain of either the ribber or the footer, as this is governed by the stitches and the length of the stocking.

The ribber portion must be 7 inches long as you cut it from the ribber, and when transferred on to the top of the stocking, the stocking should measure at least 9 inches long, to the bottom of the heel. The length of the foot is measured from the back of the heel to the end of the toe, and should be, when

finished, one-quarter inch longer than the size of the stocking you wish to make; that is, the $10\frac{1}{2}$ inch stocking should measure $10\frac{3}{4}$ inches, etc.

The total length of the stocking is from $14\frac{1}{2}$ inches to 15 inches; the ribber portion $5\frac{1}{2}$ inches, the leg 9 inches long.

Silk and Linen Braided Cord

The textile section of this bureau desires some information regarding silk and linen braided cords of diameters from $1/16$ to $\frac{1}{4}$ inch. Can you tell us what manufacturers make this material, and have you any information as to the weight per square foot and the tensile strength? Any consideration which you may care to give to this matter will be greatly appreciated. (3352)

Silk and linen cords of $1/16$ to $\frac{1}{4}$ inch diameter would probably be manufactured chiefly for such purposes as trimmings, fish lines, shoe laces and suspender equipment, and a list of makers of such products has been sent the enquirer.

With regard to the weight per square foot and the tensile strength of such products we are quite sure no information of this character has been compiled. If any reader has further information bearing on this question we would be glad to hear from him.

Bleaching Thread Silk

Please give us a good formula for bleaching thread silk. (3334)

Unless a dyer is a regular silk dyer he is likely to make the mistake, in the boil-off, of using less soap and more steam instead of more soap and less steam. To preserve the strength and luster of the silk it is necessary to use 20 per cent. to 25 per cent. of its weight in soap at 180° to 200° F. for one-half hour and repeat for a shorter time if necessary. Only pure soap, free from alkali, is allowable, and no extra alkali should be added. The boil-off should continue only to the point where the gum is entirely removed as any further heating is likely to develop flossiness. No general rule is safe because different lots of silk vary in their resistance, and it is only a short step from flossy silk to lousy silk. For safety's sake use bags or nets if possible. The bleach bath should be a slightly alkaline hydrogen peroxide, or a strength proportioned to the requirements. No metal should be in the bath and the

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temperature should be about 80° F. After one-half hour rinse well and acidulate with Acetic, Formic or other organic acid.

Never use mineral acids on silk as their drying and concentration will produce tenderness or tendency for the fibers to split. If any blueing is necessary use reddish Acid Violets or Soluble Blues in small quantity in the final rinse. Bleaching of silk is generally avoided if possible as a good boil-off and blueing will make a very good white in most cases. As long as the silk is in the gum it appears yellow, but the removal of the gum generally shows a very good white beneath, which only requires bleaching in extreme cases.

Construction of Lumberman's Socks

Will you give me details of the construction of a lumberman's sock? I would appreciate your advising me regarding the quality and size of yarn used; if part cotton, what percentage; length in inches of top, leg and average size of foot; whether practical to manufacture on a machine having 60 needles in cylinder and 30 in dial; and if not, what number of needles in cylinder and dial you would suggest. (3378)

When speaking of a lumberman's sock, a very heavy one is generally meant. These goods usually run from five to six pounds per dozen. The socks mentioned are usually made with a 2 x 2 rib top, and with 44 to 60 needles and 5½-inch cylinder. The weight is from 4½ to 6 pounds per dozen. I would suggest a 5½-inch cylinder on the footer; same size of ribber for tops, 1 x 1 rib top; with yarn running 450 to 480 grains to 50 yards. The length of rib top should be from 5½ inches to 6 inches. The goods should be boarded on an 11-inch board, made wide to accommodate the size cylinder on which socks are made. Length of leg should be such that looping course on toe of sock should come to the point where rib top and leg of stocking join when folded across center of heel. It is optional with maker or buyer whether they want to make a 1 x 1, 2 x 1 or 2 x 2 rib top. The 1 x 1 rib top will give more elasticity than either of the others. As to quality of yarn, any percentage of wool and cotton can be used. At the present time, with the Government controlling all wool, it will be a hard matter for any one to secure this commodity for civilian goods. If using a 60-needle cylinder a 12 gauge needle should be used, or an 8 gauge needle on 44 needle cylinder.

Dyeing Cotton and Silk Binding

We are enclosing two samples of seam binding made of cotton warp and silk filling. We weave this in the white, but wish to dye it in colors. The white is quite satisfactory, but after dyeing it, as you will notice, it loses a good deal of the silky effect. We also find that the binding shrinks and seems to have a tendency to cover up the silk. What would you advise as the best way of handling this binding in dyeing to get the best results as to non-shrinkage and to retain the silky luster of the filling? (3356)

The marked defect in this binding is due to the defective preparation of the material, or rather to an improper boiling off of the silk. Boiling off frees the silk from the gum that surrounds it and renders it soft and brilliant. The boiling-off bath contains soap equal to 25 to 30 per cent. of the weight of the silk to be treated. The silk is immersed in this solution for two hours at 95 deg. C. It is a good plan in order to preserve the white to immerse the silk from three-quarters of an hour to one hour in another bath containing only 15 per cent. of soap. After boiling off, the silk is rinsed thoroughly, a small quantity of carbonate of soda being added to the bath. For clear shades like the sample it is necessary to bleach with peroxide. The ribbon is treated from four to five hours in a solution of peroxide of hydrogen, 10 volumes, and three parts of silicate of soda at 40 deg. Be. Then rinse thoroughly in water.

Dyeing Hosiery in a Small Plant

I have been thinking of starting in the hosiery business in a small way and could not, of course, afford a dyer. I have had some little experience in dyeing and thought probably with the proper equipment I might be able to get away with it. Do you think it would be better to have the goods dyed outside? I would want to work probably from 30 to 50 pounds at once in black, blue, tan and gray. (3365)

The dyeing of small lots of hosiery offers relatively more difficulties than large lots. For small batches of 50 lbs. each for a single shade, the best equipment to use is a rotary dyeing machine of the laundry washer type, to contain 150 gals. of water, thus allowing 3 gals. of water for each pound of goods to be dyed.

A good dyeing requires that the hosiery must be dyed at the boil, and a steam coil is necessary, the steam being obtained

from a special boiler, or the supply arranged for from a nearby steam using establishment.

Hosiery dyeing is not a matter of formula alone, but a combination of conditions, the most important being experience along this line of work, for it is a very easy matter for a novice in dyeing to spoil a batch of stockings so that the most skillful dyer would be unable to rectify it. This is especially true of tans and grays.

When only one batch a day is to be turned out, it is doubtful if the output will warrant engaging a dyer, but if it can be arranged to have the work done in a job dyehouse where uniform results can be assured, this step is to be seriously considered.

Testing Fastness of Dyed Worsted Knitting Yarns

Are there any simple formulas for testing the fastness of dyed worsted yarns used in knitting mills? (3382)

The following simple method for testing the fastness of worsted knitting yarns was used in one of the trade laboratories and may be of interest to the inquirer:

Light Test.—Whenever possible a sample of fabric 2 inches wide and 6 inches long is used. This is placed in the light test folder in such a way that the sample is covered up, with the exception of one inch at the end of the sample. After the sample has been exposed to 25 hours of actual direct sunlight the second inch is uncovered. After the sample has been exposed to 25 additional hours of actual direct sunlight the third inch is uncovered. The exposure is made under glass in a raintight frame and exposed on a roof. The months usually best adapted for this test are July and August. A record should be kept of the sunlight in order to determine the number of hours of actual sunlight in a given period of exposure. Exposure under glass gives satisfactory results, even though the glass may act as a filter for certain light rays. The glass protects the sample from other uncertain influences—dust, rain, weather and air.

Fastness to Light, Rain and Air.—This test is carried out separately from the light test, because the gases contained in the air and in rain water affect the light test to a remarkable degree. In this case a sample is tacked to the exposure board, 36 x 36 inches, with thumb tacks, and the board is hung on a

roof for a definite number of hours. The change which takes place is noted after an exposure of 25, 50 and 100 hours (about four days). Observations are also made after 500 hours and after 1,000 hours of exposure. We are of the opinion that an exposure test of 40 days' (1,000 hours) duration is severe and sufficient for most purposes.

The fading of dyed products of any kind and the fastness of colors, depend practically on their resistance to the decolorizing action of the ultra-violet ray in sunlight, but the exposure of samples to sunlight for predetermined periods is subjected to great variation and to misinterpretation of results, due to the naturally wide variation in the amount and intensity of sunlight from day to day. For this reason Government bureaus and leading manufacturers and laboratories have discarded the sunlight method for the more reliable and scientific method utilized in ultra-violet ray color testing and fading outfits which may be set on a table in any room, and exposures in which have a value very close to eight times that of sunlight, or, roughly, one hour under the lamp equals an average day's exposure.

Finishing and Scrooping Cotton and Silk Hosiery

We are finishing cotton and silk hosiery in a washer of 100 pounds capacity, in which we use $3\frac{1}{2}$ lbs. of soap and 2 lbs. of acid for a 50-lb. lot of goods. Would it be necessary to use three and one-half times as much soap and acid to finish the same 50 lb. lot of goods in a 350-pound vat? If not to that proportion, please state just how you would determine the amount of soap and acid according to the amount of water contents. How much water is necessary to finish a 50-lb. lot of cotton and silk goods? Does the revolution of the washer determine the scroop of silk? By that I mean, does the acid bath exhaust quicker when the revolutions are greater on the washer? (3389)

For 50 pounds of cotton and silk hosiery, the proper proportion of water should be about two gallons for every pound of goods; but since a hundred pound washer is used, in all probability a trifle under two hundred gallons will be used. The amount of soap necessary for finishing would be from 3 to $3\frac{1}{2}$ pounds, which agrees with the amount being used at present; also the amount of acid should only be such as would be necessary to "cut" the soap. It is immaterial whether 50 pounds of goods or 150 pounds is to be handled, the propor-

tion of soap and acid would remain the same. The amount of water necessary to finish a 50 pound lot of cotton and silk goods is indicated above, but for the most uniform results, the greater the volume of water the more even will be the distribution of the finish. The speed of the washer has little to do in determining the scroop. The tumbling of the goods should be at such a rate that they do not fall in solid bunches, but rather break up and scatter in the bath. This means that there should be as large a volume of water as possible, and that the speed of the machine should be such that the bunches of hosiery should float as much as possible.

Mixing Jute and Flax Tow

We require for a cereal bag factory in South America a machine to make cloth. We require a machine that will mix the two vegetable fibers, samples of which we enclose. (3381)

The two fibers appear to be jute and a very low grade of flax tow, probably from straw of flax grown for seed. We see no necessity for a special machine to mix the two fibers together. If run into the sliver separately, and the two combined in the drawing, they would be well mixed when spun, though the sample of flax fiber is so full of fragments of shive that it would make a dirty, lumpy yarn. One of the chief objections to the use of low-grade flax tow in the bagging made to bale our cotton crop in the sixties, was that the shive which remained in the yarn injured any cotton baled with the bagging. The shive and trash present in the samples would doubtless become mixed with the cereal in the filled bags, from handling, and to that extent would work injury. If the proposed use of this fiber is on the score of cheapness it should be remembered that such low-grade material can produce only a very inferior product. It would be better, therefore, to use the jute alone. It would seem that the attempts to utilize this worthless seed flax for spinning fiber will never cease, in spite of all that has been written on the subject.

Strength of Sulphuric Acid to Buy

Can you give me any definite information as to relative value of 60° and 66° sulphuric acid? For instance, if 60° acid can be bought at twenty dollars per ton, and 66° at thirty dollars per ton, which would be the best strength to buy. The above figures represent approximately the difference in price of the

two strengths of acid, and I would like to know why there is such a difference in price when there is so little difference in the strength. (3417)

As to the relative value of 60° Be. and 66° Be. sulphuric acid it may be said that the 60° contains 77.67 per cent. of acid, while the 66° contains 93.19 per cent. of acid. Government fixed price (in 1918) for 60° is \$16 per ton, f.o.b. works, in tank cars; the price for 66° is \$25 per ton in tank cars. These prices are good until Dec. 31, 1918. If purchased in carboys, an extra one-half cent per pound is added. On these figures it may easily be seen that the 60° Be. concentration is the cheaper to buy, considered strictly from the standpoint of the amount of acid secured for money paid. But other considerations come in. The 66° Be. acid occupies less bulk and the purchaser does not pay freight charges on the large percentage of water contained in the 60° Be. acid. Freight charges on the 66° Be. acid will average about 16 per cent. less than on the lower grade acid. Taking everything into consideration there is not a great deal to choose between the two concentrations.

Fulling and Scouring Wool Half Hose

Please give the process and formula for scouring woolen half hose, part wool and part cotton. (3392)

The process and formula for scouring wool hose depend very largely upon the percentage of wool which the hose contains. The greater the quantity of wool, the less scouring the goods will require to bring them up to their proper finish. The usual method for scouring goods of this character is as follows:

An ordinary laundry machine or an ordinary dyeing machine of the revolving type may be used. If the goods require only to be scoured, with no fulling afterwards, the following materials should be used: To each 100 lbs. of goods use 2 lbs. of soda ash and 5 lbs. of a good grade of soap.

Allow the water to run freely through the laundry machine until the water itself, as it passes from the machine, is found to be clean. The goods may then be rinsed with cold water and about 4 per cent. of acetic acid added, after which they may be extracted and dried. However, in finishing goods of this character, it is usually necessary to full them in order to get the proper feel. This is done after the goods have been

thoroughly scoured by draining off practically all of the scouring liquor and adding 5 lbs. of soap. Add just enough water to barely cover the goods. The machine is then run for a period of 15 to 20 minutes in this strong solution of soap. The goods should be taken out at the end of this time and carefully tested to ascertain whether they have had enough fulling. If not, they may be worked for a few minutes' additional time, after which they may be rinsed in cold water and 4 per cent. of acetic acid added to the rinsing water, after which the goods are ready to be extracted.

Excellent results in the fulling of woolen hosiery may also be obtained by the use of the milling machine. This type of machine is used extensively in the underwear mills, but it will be found that exceptionally good results in the finishing of hosiery may be obtained through its use. The same quantities of soap should be used in finishing the goods in the fulling machine as are used in fulling same in the ordinary laundry machine. It will be found, however, that it will require less time to secure the same results.

Great care should be exercised in the fulling of woolen hosiery in order not to overfull the goods. This is sure to happen in case the fulling is allowed to continue too long. If the goods are overfulled they will lose all of their elasticity and will have a felty feel and appearance, and the goods will be found to crack when they are tested for their elasticity. The goods should be removed from the fulling process and dried on an ordinary hosiery form.

Measuring Cloth on the Loom

Among other features of your Journal, we find the question and answer column very interesting, and wish to add a problem of our own for your solution. We manufacture a woven paper textile which is made from spun kraft paper. After trying various methods of measuring the cloth as it comes through the loom, we are still hoping to find a better method. Among other schemes, we have tried the use of a paper tape which winds into the roll as woven, but in some ways we have so far not found it satisfactory. Can you advise us as to what companies produce devices of this kind or give us the names of some principal mills who use a device of this kind. We have also tried the cyclometer or meter device to register number of picks, but find it difficult to secure accurate record. We shall be glad to have what light you can give us on this subject from the benefit of your experience. (3403)

The most common way of measuring cloth as it comes through the loom is to put cut marks in the warp. These cut marks are put in when the warp is made, either automatically or by hand, on the slasher or dressing frame. In some blanket mills, towel mills, carpet mills, etc., the measuring is done automatically by the pattern chain, one complete repeat of the pattern being the unit of length. In addition to the above two methods, a cloth tape is sometimes used at the loom, and this is allowed to wind up on the take-up roll; then there is the method of using counters or meter devices to register the number of picks.

Cloth measuring devices for measuring the cloth after it is taken off the loom are made by various concerns, and it is possible that they could devise some special application of their products to fit your needs. It is also possible that the manufacturers of counters could develop some application of their product that would fit your special requirements if they had all the particulars of your problem. It would pay to take up the matter with such concerns. The type of loom you are using offers no special problems.

Shrinking Canvas and Adding Weight

In shrinking canvas we put the goods in water and thereby remove much of the finish and sizing. Can you inform us of something that we could add to the water to restore the weight? With this inquiry I am sending two samples of the canvas, one shrunk and the other not shrunk. (3391)

The question of shrinking is a troublesome one at all times. It is a difficult problem to shrink any kind of cloth after it is finished and still retain the finish originally put on. In examining and testing the samples submitted it is evident that there is a considerable amount of sizing used to produce the feel on the sample that has not been shrunk. The sample that is shrunk shows that this sizing has been extracted during the process of shrinking. The finish of the goods is another question altogether. From the writer's experience and from the experience of acquaintances, the same trouble is met with in nearly all classes of goods and on different qualities of cloth. The feel on the goods before shrinking is obtained by sizing the goods or starching them. It is evident that considerable gum and starch is used. After shrinking, the goods are soft and raggy to the feel, having no body, thus proving the size or starch has been extracted. The finish on

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the goods is obtained by calendering with considerable moisture in the cloth, which helps to obtain the thick feel and also helps to set the finish.

In one place where the writer was employed we had a lot of trouble with linings which had to be finished and shrunk as well. The goods were first finished to the pattern required, and during the shrinking process we had to pass the goods through water. In this water was mixed a small quantity of gum and wheat starch solution before immersing the goods. The quantity used varied according to the quality of the goods and the feel desired on the cloth. About 2 ounces of wheat starch and 4 ounces of gum were used to each gallon of water. This quantity was varied until the desired feel was obtained. After the shrinking process, and the goods were thoroughly dried, another solution was prepared before finishing. This last solution is finely sprayed on the goods and acts as a conditioner or moistener for the cloth before passing through heated rollers to obtain the necessary finish.

This spraying solution was varied to obtain different results on different classes and qualities of goods. In one solution was mixed 8 to 12 ounces of Epsom salts to the gallon, sometimes more and sometimes less, as occasion required. Another mixture was 3 ounces of wheat starch, 9 ounces dextrine. Still another mixture was 2 ounces of rice starch, 4 ounces gum and 2 ounces of corn starch to each gallon of water. The starch must always be in solution. It is cooked or rendered soluble before being stirred in the measured quantity of water.

It is a good plan to use the mixture of starch and water fairly hot, as it is more penetrating when hot. Besides the above mentioned ingredients we used glucose, bone size, which is objectionable on account of the smell, common salt, isinglass and sizes made of resin, glue and wax, all for various finishes. It is not stated that these mixtures will solve the problem for the inquirer or rid him of the trouble, but we had success with using them on our linings and they form a basis for experiment. If one mixture does not produce the exact finish he can experiment until he succeeds. The goods should be passed between rollers of some kind in order to reproduce the finish that was on the goods before shrinking.

Uneven Boiling in Finishing Cotton Tape

We are sending you a sample of cotton tape in which you will notice different shades of white. We believe that this is

due to our getting some cotton that is very dark color. The problem is to bleach the material so that it will come out a uniform white shade. We give the goods a caustic and soda ash boil, and then a chloride of lime bleach, but we are not getting the goods out uniformly. Any advice you can give us to bleach this material all to one shade in passing in one batch will be valued. (3415)

From examining the stained sample of tape, it appears that the stains are due either to uneven boiling or to the goods being exposed during the boiling process. The stains are too frequent on narrow material like this to be due to stained cotton. The writer has had dark cotton, but it did not bleach a brown like the sample. The discolorations are stains and are due to uneven packing in the kier, exposure during the boiling process, or being short of time in the boil.

The enquirer does not state how he boils the tape; whether in open kier or under pressure; he does not state the time in boiling, nor the amount of caustic or soda ash used in the boil. He does not state what amount of material he can boil at one time. The following process will give him a good uniform white if followed out in detail:

First give the goods a sulphuric acid bath at $1\frac{1}{2}^{\circ}$ Tw., and let them age for about two or three hours, covering up the pile to prevent any of the overhanging laps from getting dry. Then wash free from acid into the kier and mix up a solution of 1 per cent. caustic soda and 1 per cent. soda ash to the amount of goods in the kier. If the goods are to be boiled in an open kier they should boil at least nine hours, and pains should be taken to see that they are constantly immersed in the liquor; any places puffing up will produce the trouble complained of. A good plan is to cover the goods with burlap and then put stones or heavy weights on top to hold it down. If the goods are to be boiled in a high pressure kier, they should be boiled for six hours at 30 pounds pressure, with the same amount of caustic and soda ash.

After boiling the required length of time, wash the goods thoroughly out of the kier and give a chemic bath of $\frac{3}{4}$ to 1 degree Tw., and let them lie for three or four hours or until the goods are white enough. Sometimes they will come quicker than others, which all depends upon the boiling process.

After lying in the chemic bath the goods should be thoroughly washed free from chemic and given an acid bath at $\frac{1}{2}$ to 1 degree Tw. Let them age for a couple of hours in the acid so its action will neutralize the effects of the chemic;

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when they are ready for washing up and bluing to give them a good white appearance.

The trouble is in the boiling, and if this process does not give the goods a uniform white, the bleacher will have to increase his drugs or give a longer boil. It is certain the stains do not come from darker cotton, as the discoloration does not follow either the warp or the filling yarn.

Puttee Cloth Coming too Narrow

We are sending you under separate cover a piece of knitted puttee goods, unfulled, also two pieces of goods which have been fulled. One of the latter is the correct width, which is $4\frac{1}{4}$ inches, and the other, which we fulled ourselves, comes out too narrow. How can we get our goods out the right width? Is the unfulled piece of the right construction? We are making a number of strips at the same time on a Rashel machine, but we are not joining these together with any threads, nor do we propose to do so. We are giving this work out the way it is coming through, and it is being done very satisfactorily by outside parties. The solution which we are using in fulling consists of 6 ounces of soap, plus 2 ounces of alkali, to 1 gallon body temperature water. The rolls are laid out in layers, then tied, then put through the fulling machine. The solution is poured on uniformly as the layers rotate. No pressure is applied on the journal; 15 pounds is placed on the trap. The milling is allowed to continue for a period varying from 12 to 15 minutes. The pressure is then taken off the trap and water poured over the layers as they rotate. The washing takes place in the fulling mill, continuing about 5 minutes. The goods are then taken out and placed in a hydro-extractor, staying there until all of the water is out. They are then placed twice through an ironer, then laid out on the tables, thereby completing the drying. The finishing process is now complete. After being rolled up the material is ready for shipment. As stated before, the goods fulled in our own plant vary in width from $3\frac{1}{2}$ to 4 inches, the average being about $3\frac{3}{4}$ inches, while the same goods fulled by outside parties come out the full $4\frac{1}{4}$ inches, which is the width insisted on by the Government. (3325)

A finisher replies to this questions as follows: In regard to finishing these goods the right width a mill generally has to watch the width of the first piece very carefully in the fulling; and continue the watchfulness through washing as sometimes the goods grow narrower in washing. In regard to the construction, I think it would be advisable to make the cloth a

little firmer than the sample by using two more needles per inch. The inquirer may have to change the size of his yarn so as not to get it too heavy. I understand this should weigh $1\frac{1}{2}$ ounces per yard, so if the new layout were too heavy he will have to make the changes necessary to bring the weight down. I have shown this sample to an expert knitter and he advises also to change the construction.

Another finisher gives the following opinion: After examining the samples I believe the unfulled piece is of the right construction. The narrow piece looks to me as if it had too much fulling. I would give a little less fulling and put more weight on the trap so as to punch it up more and not let it go down in width.

Waterproofing Ramie

We enclose a sample of ramie fiber strip made from a ramie fiber and stiffened by a solution of gelatine. We wish to waterproof this material. Any information you can give us on this subject will be appreciated. (3265)

There are three ways of hardening gelatine and making it resistant to water. Chromic acid may be used, preferably in the form of an acidulated solution of chromium salt (bichromate of potash for instance). The acid is cheap, but its use will probably lead to a discoloration, which the inquirer may wish to avoid. Tannic acid can be used, but in practice this is found unstable and the same good result is not consistently obtained day in and day out. The reagent that promises best is formaldehyde solution in a strength of 40 per cent. by volume. This should be diluted to about 8 per cent. strength for use and it will make the gelatine quite horny without changing its color or creating new difficulties. The fumes of formaldehyde irritate the eyes and nose, but it should be a comparatively simple matter to run the strips through an enclosed bath and it would be practicable to dry them by heat after the operation.

Chromate Method of Dyeing

Will you be so kind and post us on the ingredients used in preparing the mordant for metal chrome or the so-called chromate method of dyeing? We understand that some of the ingredients are bichromate of soda, aluminum sulphate, and others, but do not know the proportions nor the other ingredients. (3396)

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In the chromate method of dyeing, the only addition to the dye bath is bichromate of soda, usually one-half the total weight of the dye. As the temperature of the bath is gradually raised to the boil the mordant and dyestuff affix themselves simultaneously. Acids may be added later, also some additional bichromate. This process is also known as the monochrome process. The distinction between it and the metachrome process is that the metachrome mordant uses some larger quantity of bichromate with the addition of the ammonium salt, generally the sulphate. As the bath boils, the ammonia leaves with the steam and the acids which remain help fix the chrome on the fiber.

While there was a sharp distinction made before the war between colors which were used by one or the other of these processes, it will be readily admitted that the distinction was rather one of trade specialties. At the present time no mordant dyestuff which is not precipitated by heating with a small quantity of bichromate may be dyed by either of these methods. We would suggest for medium shades $1\frac{1}{2}$ per cent. bichromate of soda, 2 per cent. sulphate of ammonia or its equivalent in acetate of ammonia. The point to be noted is that the boiling shall be thorough, otherwise if the dye has not been perfectly developed in the dye bath there may be a further change in the shade when the goods are steamed.

Knitted Chinchilla

Enclosed find a sample of white knitted fabric on which I would like to have all the information possible, including name of cloth, size and grade of yarns required, and gauge or needles per inch. (3409)

This is a chinchilla cloth which is made in the same manner as plush or fleece-lined cloth, but is finished differently. The sample seems to have been made on 20 gauge, using two threads of cotton yarn for what is the back of this cloth as used, but which is really the face of the cloth as knitted, and a wool thread for the face. The two cotton threads on the back are of different sizes, the finer one being the tying-in thread for the wool yarn. The wool yarn is put in by the ordinary backing wheel, and is tied down by every third stitch; that is to say, the wool thread is placed on the back of two needles and in front of one needle.

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The finishing appears to have been done by a brusher or napper, touching the goods very lightly so as not to destroy the loops which give the fabric the appearance of the woven chinchilla cloth.

The sample is too small to state the number of feeds on the machine, or the exact sizes of the yarns used, but these are governed by whatever weight per yard the cloth is wanted, and the diameter of the cylinder would also be determined by the width of the cloth wanted, whether 27 inches or 54 inches wide.

Chinchilla cloth is really a modification of astrachan, the difference in the two fabrics being that on the face of the chinchilla a woolen yarn is used, and on the astrachan a worsted yarn is used. There are several different methods of making and finishing, but the fabric obtained is very nearly the same in all.

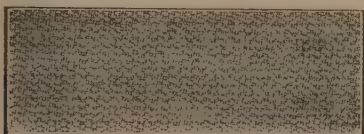
Preventing Rust Spots on Hosiery

I have read in the JOURNAL at different times inquiries as to methods to eliminate trouble with rust spots on hosiery where mills were using iron kiers for bleaching. I have been using a preparation that may help those having this trouble. I have applied it to several kiers and found it to prove very satisfactory. The first step is to procure a wire brush and brush down all rust from the inside of the kier; then wash with hot water, let dry, and if necessary repeat. When the kier is thoroughly dry, apply a coat of Portland cement and water, and paint all the inside of the kier, starting from the bottom. Have the preparation thick enough so that when painting it will make no water lines. When this coat is thoroughly dry, add to the kier about 100 pounds of caustic soda (dry); fill with cold water to the regular water level, cover the kier and if possible run steam pressure to five pounds and hold this for one hour; blow off and let thoroughly cool. The result will be a white coat. Repeat the cement and caustic operation when it is noticed the kier needs another coat.

Military Webbing Suitable for Weaving on Light Weight Looms

I have a few narrow fabric looms which I would like to run on Government goods up to 2 inches wide. Will you kindly

advise me what is the most suitable work for light weight 12 shuttle looms, and the specifications? I would also like sample if possible. Can you also advise me of firms sub-letting orders for this kind of work? (3375)



¾-INCH MILITARY WEBBING THAT CAN
BE WOVEN ON LIGHT LOOMS

The sample of ¾ inch Government webbing shown in the illustration represents a quality which might be suitable for the light weight ribbon looms available without involving much change of their parts. This cloth is made in different widths up to 2 inches. The specifications for the ¾ inch fabric call for .31 ounces per yard and 54 picks per inch. This is a double cloth weave, and to make it satisfactorily it is advisable to divide up the warps as follows:

Edge	17 threads of 20/2
Face	26 threads of 20/2
Back	26 threads of 20/2
Binder	14 threads of 16/2

Of course, the edge, face and back, being of the same general weave, might be run from the same warp, but there would be difficulty encountered in getting a proper shed clearance for the threads. The reed required is 18 dents per inch.

We do not know definitely of any companies that are sub-letting orders for this class of work, or having weaving done on commission, but it would do no harm for the inquirer to write many of the narrow webbing manufacturers for this information.

Cotton Spindles in the United States

Can you tell me about what is the average increase, per year, in the number of cotton spindles in the United States? Can you also inform me as to the number of cotton spindles in each state? (3315)

The annual increase varies, of course, with general conditions. In the ten years from 1907 to 1917, the total number

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of spindles increased from 26,375,191 to 33,888,835, an approximate increase of 7,500,000, or 750,000 spindles per year. This ratio of increase was not evenly distributed during that period. In fact, the period from 1914 to 1915 showed a decrease. Since 1915, the average increase has been about 1,000,000 spindles per year. In the year ending 1917, the increase in the South was 773,693 and in the northern states, 309,259. Of the total number of spindles, about 14,000,000 are in the cotton growing states and about 19,700,000 in New England and other northern states.

The number of spindles in the different states in 1917 is as follows:

Alabama	1,136,786
Connecticut	1,372,860
Georgia	2,422,810
Illinois	62,168
Indiana	85,576
Kentucky	91,244
Louisiana	93,408
Maine	1,099,278
Maryland	147,764
Massachusetts	11,280,351
Mississippi	167,604
New Hampshire	1,459,853
New Jersey	491,843
New York	938,158
North Carolina	4,375,283
Pennsylvania	256,314
Rhode Island	2,653,397
South Carolina	4,851,161
Tennessee	350,352
Texas	128,112
Vermont	135,864
Virginia	528,394
Other states	92,672

Cotton Seed Oil as a Lubricant for Wool Fibers

Needing oil to replace oleine for lubrication of wool before carding, and finding it difficult to get a supply from the United States, I have the intention to treat cotton seed oil in order to see if I can succeed in producing some useful lubricating oil for the purpose. Will you be so kind as to ask your readers to favor me with the best process for getting such an oil.

We have plenty of cotton seed oil here refined, and we can get it also deodorized. Please tell me the best way to arrive at something practical in this line. With many thanks, and being at your order for what you may want here, I remain, etc. (3324)

This inquiry relating to the possible use of cotton seed oil as a lubricant for wool fibers was received from a South American reader. In reply we may say that cotton seed oil has never been used in this country as an ingredient in wool oils, because of the fundamental reason that it is chemically classed among the drying oils. If an emulsion of cotton seed oil were made up and used for the purpose indicated the effect of the drying properties of the oil would become apparent at once on the cards, and there would be no end of trouble caused by the gumming up of the cards. The wool oils at present used in this country contain approximately 80 per cent. of mineral oil and other fatty bodies ranging from red oil to recovered wool grease. It might be possible for him to use a small quantity of cotton seed oil, around 5 per cent., and so get an emulsion, but it would be entirely a new proposition. We note that he has cotton seed oil refined and deodorized in plenty, and may say for his information that this is being largely used in the manufacture of soap powders for domestic and textile purposes.

Analyses of Coals

We understand that you publish a book giving the analyses of the different coals produced throughout the United States. We are very anxious to secure information concerning the different types of coal produced in Virginia, West Virginia, Tennessee and Kentucky; so if you have a book that will furnish this information, we will thank you to forward one to us by first mail. (3376)

We do not publish a book on different coals, but you can easily secure such a publication or publications from the Bureau of Mines, Department of the Interior, Washington.

Prominent Streaks in Dyed Mercerized Hosiery

Under separate cover I am sending you four pairs of mercerized hose dyed different shades. Can you let me know the cause of the prominent streaks in the different shades. Is there anything that can be done to overcome this trouble? These particular shades are all semi-bleached and dyed afterward. We have tried several other methods and still have the streaks.

One of our methods is dyeing them in a heavy soluble oil bath, starting at a very low temperature and bringing heat slowly up to 200° F. This will not overcome the streaks. I understand that there are several other mills using the same yarn that have the same trouble. If there is any way the difficulty can be overcome will appreciate knowing the remedy. (3397)

Since no details are given as to how these goods have been bleached or dyed, it is with difficulty that a satisfactory answer can be made. On one pair of stockings the stains appear to be the result of using too strong a dyebath at the beginning of dyeing, causing too much color to jump on the goods. It is to be remembered that mercerized cotton has a greater affinity for most dyes than plain cotton. The other stockings appear to bear out the opinion that the bleaching chemicals have not been completely removed from the goods before being put into the dyebath.

Before being dyed, these goods should be completely washed free of all chemicals by means of plenty of water, and when actual dyeing begins, to add the color, previously dissolved, to the dyebath in successive portions, and only so fast as the cotton takes it up from the dye liquor. Too much dye in the bath at one time, when dyeing mercerized cotton, always tends to give uneven results. The use of soluble oil in the bath is good, but it might be improved upon by steeping the stockings in a bath of soluble oil heated to about 165° F., before dyeing. This will have a tendency to even up the cotton, and remove any possible spots showing after dyeing.

This enquirer later sent in the following information on his difficulty:

Since writing you regarding streaks that were so prominent in our hosiery after dyeing, I have found a way to eliminate this difficulty to such an extent that our finisher makes very little complaint. From the several experiments that I made, I finally came to the conclusion that the streaks were caused by the yarn not being evenly boiled out previous to mercerizing, and, in making further experiment from this point, found that it was a good plan to give the hosiery, direct from the knitting room, a half-hour's boil with 4 per cent. to 6 per cent. of a good scouring soap. I have used oleine soap or Quaker bleaching soap in an open wooden tub with about 300 gallons of water. Following the boiling out I rinse in a hot wash for about 10 minutes; warm wash for about 5 minutes, and then give one cold wash. I dye in this wet state as usual.

Estimating the Size of Silk

I would like to take advantage of your Question and Answer Department, regarding a matter which I have run across a few times in the last few years. It is in the figuring of denier silk. Has 14/16 denier got an average of 15 strands of natural silk from the cocoon; or, in other words, could a 14/16 denier silk be identified by the number of strands it contains? (3431)

The silk, as spun into a cocoon by the silk worm, is in the form of a double thread. Several cocoon filaments are reeled together to make a thread of raw silk, hence the number of filaments in any thread of raw silk will be an even number. An exception occurs when the unwinding continues almost to the point of exhaustion of the cocoon where the fiber becomes very attenuated, and it may happen that the worm, towards the end, has exhausted the silk from one gland, and is emitting only a single fiber. In the part of the thread where a cocoon so exhausted is being reeled in, there might be an odd number of filaments. There is no rule to go by in estimating the size of the raw silk from the number of filaments, as the size varies greatly.

Dr. Akira Shito, the Director of the Imperial Japanese Silk Conditioning House at Yokohama, very kindly prepared for the writer, prior to his leaving Japan on his recent visit to this country, some figures covering this field, which he subsequently used in connection with a brochure which he issued to the trade. The information so afforded is as follows:

The average sizes (in deniers) of the filament of Japanese cocoons are as follows:

Cocoons	Average Size	Finest	Coarsest
Spring	3.0	2.0	4.5
Summer	2.7	1.85	4.35
Autumn	2.7	1.85	4.35

The number of cocoons reeled together to make the denier sizes of raw silk are as follows:

Denier Size of Raw Silk	Spring Cocoon	Summer Cocoon	Autumn Cocoon
13/15	4 — 5	5 — 6	5 — 6
16/18	5 — 6	6 — 7	6 — 7
20/22	6 — 7	7 — 8	7 — 8

(Mr. Shito estimated the spring crop to represent 60 per cent. of the total, the summer being very small, perhaps not over 5 per cent., leaving 35 per cent. for the autumn.)

Therefore, a 14/16 denier silk, averaging 15 deniers, might be made of 5 spring cocoons of average size, which would give 10 filaments; or say 4 coarse cocoons, which would give 8; or 7 finer cocoons, which would give 14; and similarly for the summer and autumn cocoons.

There is no way to tell from the finished goods whether spring, summer or autumn cocoons have been used, or whether the silk is Chinese, European, or what not. From the wide variations which exist between the finest and coarsest cocoons, of whatever season they might be, it is apparent that no rule can be laid down on the subject. The writer is of the opinion that the 14/16 denier size, if of Japanese silk, would most likely be made from 6 cocoons, with a large amount made of 5 cocoons, but at best this is only an opinion.

If the silk were Canton, where the cocoons are of smaller size and finer denier, 7 or 8 cocoons might be reeled for the 14/16 denier size, which would then give 14 to 16 filaments.

The counting of cocoon filaments may have some slight value as collateral information in estimating the size of raw silk, but in no sense can it be relied upon as a test.

Use of Archil Extract

What is archil extract used for and is there any field for it at present? (3366)

Archil extract is an imported natural dyestuff which was used largely by the old dyers in the production of crimson, maroon and plum shades on wool. Quite a little has been used up to recently in this country in the production of fancy shades on ladies' dress goods; but the civilian business has fallen flat and there is little or no buying of this commodity at the present time.

Oil Spots on Knitting Yarn

Can you tell me the cause of the black spots in the enclosed piece of knitted cloth, whether it is in the yarn before knitting, or is it oil from the knitting frame? (3362)

The spots occur at regular intervals in the fabric, and this would seem to point to one spot of oil having dropped on the bobbin, either from the knitting machine or while in process of winding.

Spotted Effect on Dyed Stockings

I am sending you a pair of silk dyed champagne shade stockings. Will you kindly let me know what causes the spotted effect so prominent in the body of the hose? (3336)

After carefully examining the stockings we feel that these spots are due to precipitation in the dye bath. We have no way of ascertaining the type of color used in dyeing this shade, but inasmuch as this shade can be easily obtained by the use of Direct Colors and Acid Colors, we can see no reason why this trouble should exist. The stocking shows plainly that the trouble is caused either by precipitation of the dye bath, or the goods have been dyed in a vat which has been used for darker shades. It is also barely possible that the goods had oil spots on them before dyeing.

Boiling-off Silk Hosiery

Recently we have transferred our machines to the manufacture of pure silk goods. After sending out samples we received a few complaints that the goods were too soft. Will you please advise what you think is the trouble? Is it in the drying? And if so will you kindly give us a formula for dyeing silk to check up against our formula. For our colors we use a machine constructed with a paddle wheel, the hosiery being put into bags to be boiled-out and again to be dyed. We find they have a tendency to knot, thereby preventing the fabric from dyeing evenly. In fact, some of them come out quite spotted and have to be re-dyed. This is for colors only. For black we have a "Uniform" machine which works very well. (3332)

The most likely reason for the softness of the silk stockings is that the boil-off has been carried too far. By modifying the boil-off so as to leave some of the gum still on the silk the goods can be made much firmer.

The dyes that are used, of whatever class, should be combined with a portion of boil-off liquor and acetic acid, and the goods should finally leave the bath slightly acid. By observing both of these conditions there will be less tendency to tangle and less unevenness. Do not boil the bath vigorously even if you use nets. The ordinary paddle machine is generally satisfactory if not overloaded.

To determine the exact degree of boil-off will require a few experiments. The natural gum will not interfere with the dyeing and is a better sizing material than gelatine, glue or gum added after dyeing.

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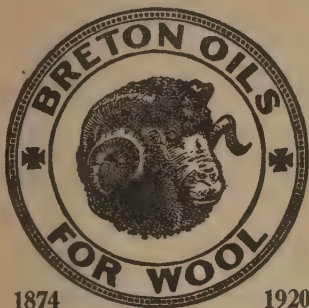
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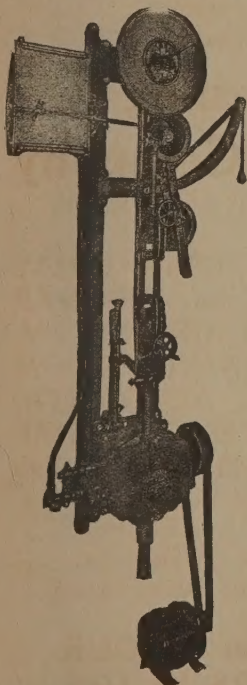
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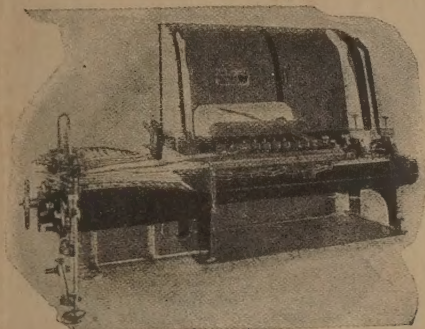
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